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In this issue: **NAUDSONCE** by H. Beam Piper

BLACK MAN'S BURDEN by Mack Reynolds

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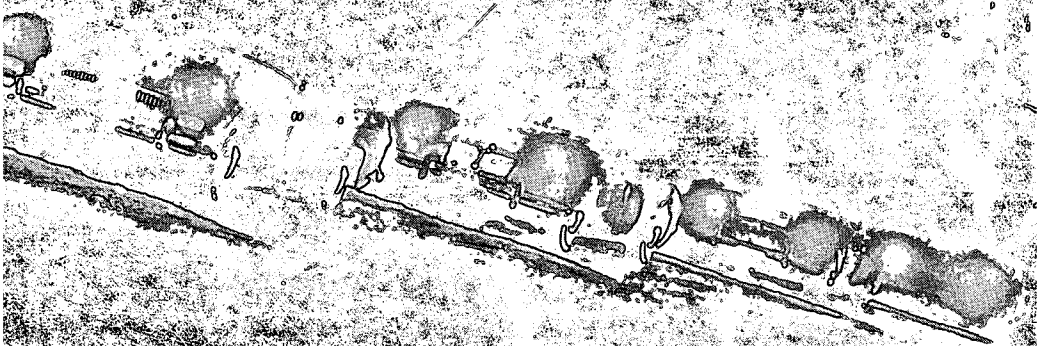

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SCIENCE FACT ⚛ SCIENCE FICTION

VOL. LXVIII, NO. 5 • JANUARY 1962

Novelettes

Naudsonce, *H. Beam Piper*.....6
Worm in the Woodwork, *E. C. Tubb*.....60

Short Story

Idiot Solvant, *Gordon R. Dickson*.....45

Serial

Black Man's Burden, *Mack Reynolds*.....110
(*Conclusion*)

Science Fact

The Big Boom in Forming, *Willis Cain*.....83
Cover: When the Glaciers Go.....106

Readers' Departments

The Editor's Page.....4
The Reference Library.....156
P. Schuyler Miller
Brass Tacks.....165
In Times to Come.....178

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"It ain't my job..."

Some years ago, the police department of one of the towns in the Boston area pulled a classic goof. Boston-area streets are, generally speaking, the results of what has been termed "cow-path engineering"; they wander, twist, and veer in such a way that it's quite normally impossible to see more than a couple of blocks along a street.

In seeking to improve traffic flow —an end greatly to be desired!—the police had set up a lot of new ONE WAY signs. However, somebody goofed slightly, with the result that, at one intersection, three one-way streets fed in, and the fourth street was a dead end. The following day the Boston papers had fun with the item, naturally.

Recently I found myself in an almost equally inane trap—but with a remarkable difference, a difference that has brought very clearly to my attention a considerably more important factor in our cultural setup.

The New York State Thruway Authority goofed, in this case; the gasoline-and-food service areas along the Thruway were designed and built by the Thruway, with the gasoline and restaurants being operated by concessionaires, and the whole system policed by the State police. The service areas along the entire near-500-mile length of the Thruway are built on the same plan, and the police rules are uniform. The Thruway has been in operation for a number of years now—and each of the Thruway service areas has a neat little booby trap set up by those police rules that's almost equivalent to the three-one-ways-and-a-dead-end situation.

Briefly, the distribution of ONE WAY and NO PARKING OR STANDING signs at the service areas is such that if you pull off the Thruway, and go directly to the gas-pumps . . . there is no legal way for either the driver or his passengers to use the rest rooms! Correction; the

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passengers can legally visit the rest rooms—but the driver is required by law to abandon them to their fate unless they're spry enough to get back in the car before the gas tank's filled.

That comes about because the only legal parking area is on the up-traffic side of the restaurant; if you don't know the trick setup and by-pass the parking-lot entrance—you want gas, and aren't hungry—you've passed the Point Of No Return. Next parking area *n* miles down the Thruway—*n* being anywhere from twenty to forty miles to the next restaurant area. You can't pull just outside the service area and wait; it's illegal to park along the Thruway unless there's car trouble.

Localites, no doubt, know about the system, and park in the restaurant area, use the rest rooms, and then get gas. Perfectly possible and legal. It's just unique and unexpected; all other State Turnpike, Thruway and/or Parkway systems provide parking for gasoline customers, too.

The Thruway police enforce the situation, too; I have the traffic ticket to prove it, since I willfully and knowingly violated the no-parking regulation, and refused to abandon my wife and daughter as required by law. (You have your choice of that, or driving the wrong way on a one-way drive to reach the parking area.)

The interesting thing is that that stupid situation has been going on for some years now!

I found out why. Officer George—that's the way he signs his tickets—was very positively not in the slightest interested in discussing how I could rationally obey the rules, once I had passed the parking lot entrance—which has no sign indicating it's a Point of No Return. He stated that he didn't make the laws; his job was to enforce them, and that I should tell it to the Judge. He was totally disinterested in the point that the situation was about as practical as the

« *Continued on page 173* »

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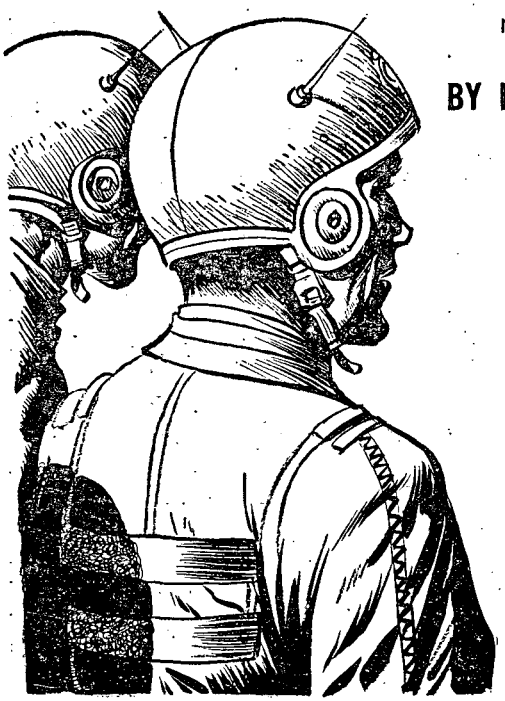
NAUDSONCE

Bishop Berkeley's famous question
about the sound of a falling tree
may have no standing in Science.
But there is a highly interesting
question about "sound" that Science
needs to consider . . .

BY H. BEAM PIPER



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The sun warmed Mark Howell's back pleasantly. Underfoot, the mosslike stuff was soft and yielding, and there was a fragrance in the air unlike anything he had ever smelled. He was going to like this planet; he knew it. The question was, how would it, and its people, like him? He watched the little figures advancing across the fields from the mound, with the village out of sight on the other end of it and the combat-car circling lazily on contragravity above.

Major Luis Gofredo, the Marine officer, spoke without lowering his binoculars:

"They have a tubular thing about twelve feet long; six of them are carrying it on poles, three to a side, and a couple more are walking behind it. Mark, do you think it could be a cannon?"

So far, he didn't know enough to have an opinion, and said so, adding:

"What I saw of the village in the screen from the car, it looked pretty primitive. Of course, gunpowder's one of those things a primitive people could discover by accident, if the ingredients were available."

"We won't take any chances, then."

"You think they're hostile? I was hoping they were coming out to parley with us."

That was Paul Meillard. He had a right to be anxious; his whole future in the Colonial Office would be made or ruined by what was going to happen here.

The joint Space Navy-Colonial Office expedition was looking for new planets suitable for colonization; they had been out, now, for four years, which was close to maximum for an exploring expedition. They had entered eleven systems, and made landings on eight planets. Three had been reasonably close to Terra-type. There had been Fafnir; conditions there would correspond to Terra during the Cretaceous Period, but any Cretaceous dinosaur would have been cute and cuddly to the things on Fafnir. Then there had been Imhotep; in twenty or thirty thousand years, it would be a fine planet, but at present it was undergoing an extensive glaciation. And Irminsul, covered with forests of gigantic trees; it would have been fine except for the fauna, which was nasty, especially a race of subsapient near-humanoids who had just gotten as far as clubs and *coup-de-poing* axes. Contact with them had entailed heavy ammunition expenditure, with two men and a woman killed and a dozen injured. He'd had a limp, himself, for a while as a result.

As for the other five, one had been an all-out hell-planet, and the rest had been the sort that get colonized by irreconcilable minority-groups who want to get away from everybody else. The Colonial Office wouldn't even consider any of them.

Then they had found this one, third of a GO-star, eighty million miles from primary, less axial inclination than Terra, which would mean a more uniform year-round

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temperature, and about half land surface. On the evidence of a couple of sneak landings for specimens, the biochemistry was identical with Terra's and the organic matter was edible. It was the sort of planet every explorer dreams of finding, except for one thing.

It was inhabited by a sapient humanoid race, and some of them were civilized enough to put it in Class V, and Colonial Office doctrine on Class V planets was rigid. Friendly relations with the natives had to be established, and permission to settle had to be guaranteed in a treaty of some sort with somebody more or less authorized to make one.

If Paul Meillard could accomplish that, he had it made. He would stay on with forty or fifty of the ship's company to make preparations. In a year a couple of ships would come out from Terra, with a thousand colonists, and a battalion or so of Federation troops, to protect them from the natives and vice versa. Meillard would automatically be appointed governor-general.

But if he failed, he was through. Not out—just through. When he got back to Terra, he would be promoted to some home office position at slightly higher base pay but without the three hundred per cent extra-terrestrial bonus, and he would vegetate there till he retired. Every time his name came up, somebody would say, "Oh, yes; he flubbed the contact on Whatzit."

It wouldn't do the rest of them any good, either. There would always be the suspicion that they had contributed to the failure.

Bwaaa-waaa-waaanh!

The wavering sound hung for an instant in the air. A few seconds later, it was repeated, then repeated again.

"Our cannon's a horn," Gofredo said. "I can't see how they're blowing it, though."

There was a stir to right and left, among the Marines deployed in a crescent line on either side of the contact team; a metallic clatter as weapons were checked. A shadow fell in front of them as a combat-car moved into position above.

"What do you suppose it means?" Meillard wondered.

"Terrans, go home." He drew a frown from Meillard with the suggestion. "Maybe it's supposed to intimidate us."

"They're probably doing it to encourage themselves," Anna de Jong, the psychologist, said. "I'll bet they're really scared stiff."

"I see how they're blowing it," Gofredo said. "The man who's walking behind it has a hand-bellows." He raised his voice. "Fix bayonets! These people don't know anything about rifles, but they know what spears are. They have some of their own."

So they had. The six who walked in the lead were unarmed, unless the thing one of them carried was a spear. So, it seemed, were the horn-

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bearers. Behind them, however, in an open-order skirmish-line, came fifty-odd with weapons. Most of them had spears, the points glinting redly. Bronze, with a high copper content. A few had bows. They came slowly; details became more plainly visible.

The leader wore a long yellow robe; the thing in his hand was a bronze-headed staff. Three of his companions also wore robes; the other two were bare-legged in short tunics. The horn-bearers wore either robes or tunics; the spearmen and bowmen behind either wore tunics or were naked except for breechclouts. All wore sandals. They were red-brown in color, completely hairless; they had long necks, almost chinless lower jaws, and fleshy, beaklike noses that gave them an avian appearance which was heightened by red crests, like roosters' combs, on the tops of their heads.

"Well, aren't they something to see?" Lillian Ransby, the linguist asked.

"I wonder how we look to them," Paul Meillard said.

That was something to wonder about, too. The differences between one and another of the Terrans must puzzle them. Paul Meillard, as close to being a pure Negro as anybody in the Seventh Century of the Atomic Era was to being pure anything. Lillian Ransby, almost ash-blond. Major Gofredo, barely over the minimum Service height requirement; his name was Old Terran Spanish, but his ancestry must have been Polynesian, Amerind and Mongolian. Karl Dorver, the sociographer, six feet six, with red hair. Bennet Fayon, the biologist and physiologist, plump, pink-faced and balding. Willi Schallenmacher, with a bushy black beard . . .

They didn't have any ears, he noticed, and then he was taking stock of the things they wore and carried. Belts, with pouches, and knives with flat bronze blades and riveted handles. Three of the delegation had small flutes hung by cords around their necks, and a fourth had a reed Pan-pipe. No shields, and no swords; that was good. Swords and shields mean organized warfare, possibly a warrior-caste. This crowd weren't warriors. The spearmen and bowmen weren't arrayed for battle, but for a drive-hunt, with the bows behind the spears to stop anything that broke through the line.

"All right; let's go meet them." The querulous, uncertain note was gone from Meillard's voice; he knew what to do and how to do it.

Gofredo called to the Marines to stand fast. Then they were advancing to meet the natives, and when they were twenty feet apart, both groups halted. The horn stopped blowing. The one in the yellow robe lifted his staff and said something that sounded like, *"Tweedle-eedle-oodly-eenk."*

The horn, he saw, was made of strips of leather, wound spirally and coated with some kind of varnish.

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Everything these people had was carefully and finely made. An old culture, but a static one. Probably tradition-bound as all get-out.

Meillard was raising his hands; solemnly he addressed the natives:

"'Twas brillig and the slithy toves were whooping it up in the Malemute Saloon, and the kid that handled the music box did gyre and gimble in the wabe, and back of the bar in a solo game all mimsy were the borogoves, and the mome raths outgabe the lady that's known as Lou."

That was supposed to show them that we, too, have a spoken language, to prove that their language and ours were mutually incomprehensible, and to demonstrate the need for devising a means of communication. At least that was what the book said. It demonstrated nothing of the sort to this crowd. It scared them. The dignitary with the staff twittered excitedly. One of his companions agreed with him at length. Another started to reach for his knife, then remembered his manners. The bellowsman pumped a few blasts on the horn.

"What do you think of the language?" he asked Lillian.

"They all sound that bad, when you first hear them. Give them a few seconds, and then we'll have Phase Two."

When the gibbering and skreeking began to fall off, she stepped forward. Lillian was, herself, a good test of how human aliens were; this gang weren't human enough to whistle at her. She touched herself on the breast. "Me," she said.

The natives seemed shocked. She repeated the gesture and the word, then turned and addressed Paul Meillard. "You."

"Me," Meillard said, pointing to himself. Then he said, "You," to Luis Gofredo. It went around the contact team; when it came to him, he returned it to point of origin.

"I don't think they get it at all," he added in a whisper.

"They ought to," Lillian said. "Every language has a word for self and a word for person-addressed."

"Well, look at them," Karl Dorver invited. "Six different opinions about what we mean, and now the band's starting an argument of their own."

"Phase Two-A," Lillian said firmly, stepping forward. She pointed to herself. "Me—Lillian Ransby. Lillian Ransby—me *name*. You—*name?*"

"Bwoooo!" the spokesman screamed in horror, clutching his staff as though to shield it from profanation. The others howled like a hound-pack at a full moon, except one of the short-tunic boys, who was slapping himself on the head with both hands and yodeling. The horn-crew hastily swung their piece around at the Terrans, pumping frantically.

"What do you suppose I said?" Lillian asked.

"Oh, something like, 'Curse your gods, death to your king, and spit in your mother's face,' I suppose."

"Let me try it," Gofredo said.

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The little Marine major went through the same routine. At his first word, the uproar stopped; before he was through, the natives' faces were sagging and crumbling into expressions of utter and heart-broken grief.

"It's not as bad as all that, is it?" he said. "You try it, Mark."

"Me. . . . Mark . . . Howell . . ." They looked bewildered.

"Let's try objects, and play-acting," Lillian suggested. "They're farmers; they ought to have a word for water."

They spent almost an hour at it. They poured out two gallons of water, pretended to be thirsty, gave each other drinks. The natives simply couldn't agree on the word, in their own language, for water. That or else they missed the point of the whole act. They tried fire, next. The efficiency of a steel hatchet was impressive, and so was the sudden flame of a pocket-lighter, but no word for fire emerged, either.

"Ah, to Nifflheim with it!" Luis Gofredo cried in exasperation. "We're getting nowhere at five times light speed. Give them their presents and send them home, Paul."

"Sheath-knives; they'll have to be shown how sharp they are," he suggested. "Red bandannas. And costume jewelry."

"How about something to eat, Bennet?" Meillard asked Fayon.

"Extee Three, and C-H trade candy," Fayon said. Field Ration, Extraterrestrial Service, Type Three, could be eaten by anything with a carbon-hydrogen metabolism, and so could the trade candy. "Nothing else, though, till we have some idea what goes on inside them."

Dorver thought the six members of the delegation would be persons of special consequence, and should have something extra. That was probably so. Dorver was as quick to pick up clues to an alien social order as he was, himself, to deduce a culture pattern from a few artifacts. He and Lillian went back to the landing craft to collect the presents.

Everybody, horn-detail, armed guard and all, got one ten-inch bowie knife and sheath, a red bandanna neckcloth, and a piece of flashy junk jewelry. The (town council? prominent citizens? or what?) also received a colored table-spread apiece; these were draped over their shoulders and fastened with two-inch plastic pins advertising the candidacy of somebody for President of the Federation Member Republic of Venus a couple of elections ago. They all looked woebegone about it; that would be their expression of joy. Different type nerves and different facial musculature, Fayon thought. As soon as they sampled the Extee Three and candy, they looked crushed under all the sorrows of the galaxy.

By pantomime and pointing to the sun, Meillard managed to inform them that the next day, when the sun was in the same position, the Terrans would visit their village, bringing more gifts. The natives were quite agreeable, but Meillard was

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disgruntled that he had to use sign-talk. The natives started off toward the village on the mound, munching Extee Three and trying out their new knives. This time tomorrow, half of them would have bandaged thumbs.

The Marine riflemen and submachine-gunners were coming in, slinging their weapons and lighting cigarettes. A couple of Navy technicians were getting a snooper—a thing shaped like a short-tailed tadpole, six feet long by three at the widest, fitted with visible-light and infra-red screen pickups and crammed with detection instruments—ready to relieve the combat car over the village. The contact team crowded into the Number One landing craft, which had been fitted out as a temporary headquarters. Prefab-hut elements were already being unloaded from the other craft.

Everybody felt that a drink was in order, even if it was two hours short of cocktail time. They carried bottles and glasses and ice to the front of the landing craft and sat down in front of the battery of view and communication screens. The central screen was a two-way, tuned to one in the officers' lounge aboard the *Hubert Penrose,* two hundred miles above. In it, also provided with drinks, were Captain Guy Vindinho and two other Navy officers, and a Marine captain in shipboard blues. Like Gofredo, Vindinho must have gotten into the Service on tiptoe; he had a bald dome and a red beard, and he always looked as though he were gloating because nobody knew that his name was really Rumplestiltskin. He had been watching the contact by screen. He lifted his glass toward Meillard.

"Over the hump, Paul?"

Meillard raised his drink to Vindinho. "Over the first one. There's a whole string of them ahead. At least, we sent them away happy. I hope."

"You're going to make permanent camp where you are now?" one of the other officers asked. Lieutenant-Commander Dave Questell; ground engineering and construction officer. "What do you need?"

There were two viewscreens from pickups aboard the 2500-foot battle cruiser. One, at ten-power magnification, gave a maplike view of the broad valley and the uplands and mountain foothills to the south. It was only by tracing the course of the main river and its tributaries that they could find the tiny spot of the native village, and they couldn't see the landing craft at all. The other, at a hundred power, showed the oblong mound, with the village on its flat top, little dots around a circular central plaza. They could see the two turtle-shaped landing-craft, and the combat car, that had been circling over the mound, landing beside them, and, sometimes, a glint of sunlight from the snooper that had taken its place.

The snooper was also transmitting in, to another screen, from two hundred feet above the village. From the

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sound outlet came an incessant gibber of native voices. There were over a hundred houses, all small and square, with pyramidal roofs. On the end of the mound toward the Terran camp, animals of at least four different species were crowded, cattle that had been herded up from the meadows at the first alarm. The open circle in the middle of the village was crowded, and more natives lined the low palisade along the edge of the mound.

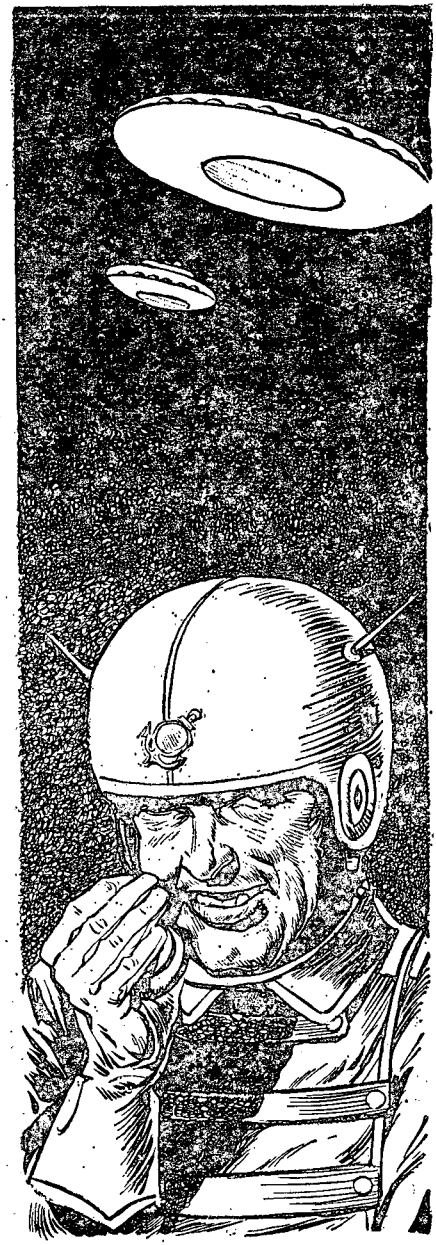
"Well, we're going to stay here till we learn the language," Meillard was saying. "This is the best place for it. It's completely isolated, forests on both sides, and seventy miles to the nearest other village. If we're careful, we can stay here as long as we want to and nobody'll find out about us. Then, after we can talk with these people, we'll go to the big town."

The big town was two hundred and fifty miles down the valley, at the forks of the main river, a veritable metropolis of almost three thousand people. That was where the treaty would have to be negotiated.

". . . But no two of them speak the same language!"

"You'll want more huts. You'll want a water tank, and a pipeline to that stream below you, and a pump," Questell said. "You think a month?"

Meillard looked at Lillian Ransby. "What do you think?"



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"Poodly-doodly-oodly-foodle," she said. "You saw how far we didn't get this afternoon. All we found out was that none of the standard procedures work at all." She made a tossing gesture over her shoulder. "There goes the book; we have to do it off the cuff from here."

"Suppose we make another landing, back in the mountains, say two or three hundred miles south of you," Vindinho said. "It's not right to keep the rest aboard two hundred miles off planet, and you won't be wanting liberty parties coming down where you are."

"The country over there looks uninhabited," Meillard said. "No villages, anyhow. That wouldn't hurt, at all."

"Well, it'll suit me," Charley Loughran, the xeno-naturalist, said. "I want a chance to study the lifeforms in a state of nature."

Vindinho nodded. "Luis, do you anticipate any trouble with this crowd here?" he asked.

"How about it, Mark? What do they look like to you? Warlike?"

"No." He stated the opinion he had formed. "I had a close look at their weapons when they came in for their presents. Hunting arms. Most of the spears have cross-guards, usually wooden, lashed on, to prevent a wounded animal from running up the spear-shaft at the hunter. They made boar-spears like that on Terra a thousand years ago. Maybe they have to fight raiding parties from the hills once in a while, but not often enough for them to develop special fighting weapons or techniques."

"Their village is fortified," Meillard mentioned.

"I question that," Gofredo differed. "There won't be more than a total of five hundred there; call that a fighting strength of two hundred, to defend a twenty-five-hundred-meter perimeter, with woodchoppers' axes and bows and spears. If you notice, there's no wall around the village itself. That palisade is just a fence."

"Why would they mound the village up?" Questell, in the screen wondered. "You don't think the river gets up that high, do you? Because if it does—"

Schallenmacher shook his head. "There just isn't enough watershed, and there's too much valley. I'll be very much surprised if that stream, there"—he nodded at the hundred-power screen— "ever gets more than six inches over the bank."

"I don't know what those houses are built of. This is all alluvial country; building stone would be almost unobtainable. I don't see anything like a brick kiln. I don't see any evidence of irrigation, either, so there must be plenty of rainfall. If they use adobe, or sun-dried brick, houses would start to crumble in a few years, and they would be pulled down and the rubble shoved aside to make room for a new house. The village has been rising on its own ruins, probably shifting back and forth from one end of that mound to the other."

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"If that's it, they've been there a long time," Karl Dorver said. "And how far have they advanced?"

"Early bronze; I'll bet they still use a lot of stone implements. Pre-dynastic Egypt, or very early Tigris-Euphrates, in Terran terms. I can't see any evidence that they have the wheel. They have draft animals; when we were coming down, I saw a few of them pulling pole travoises. I'd say they've been farming for a long time. They have quite a diversity of crops, and I suspect that they have some idea of crop-rotation. I'm amazed at their musical instruments; they seem to have put more skill into making them than anything else. I'm going to take a jeep, while they're all in the village, and have a look around the fields, now."

Charley Loughran went along for specimens, and, for the ride, Lillian Ransby. Most of his guesses, he found, had been correct. He found a number of pole travoises, from which the animals had been unhitched in the first panic when the landing craft had been coming down. Some of them had big baskets permanently attached. There were drag-marks everywhere in the soft ground, but not a single wheel track. He found one plow, cunningly put together with wooden pegs and rawhide lashings; the point was stone, and it would only score a narrow groove, not a proper furrow. It was, however, fitted with a big bronze ring to which a draft animal could be hitched. Most of the cultivation seemed to have been done with spades and hoes. He found a couple of each, bronze, cast flat in an open-top mold. They hadn't learned to make composite molds.

There was an even wider variety of crops than he had expected: two cereals, a number of different root-plants, and a lot of different legumes, and things like tomatoes and pumpkins.

"Bet these people had a pretty good life, here—before the Terrans came," Charley observed.

"Don't say that in front of Paul," Lillian warned. "He has enough to worry about now, without starting him on whether we'll do these people more harm than good."

Two more landing craft had come down from the *Hubert Penrose;* they found Dave Questell superintending the unloading of more prefab-huts, and two were already up that had been brought down with the first landing.

A name for the planet had also arrived.

"Svantovit," Karl Dorver told him. "Principal god of the Baltic Slavs, about three thousand years ago. Guy Vindinho dug it out of the 'Encyclopedia of Mythology.' Svantovit was represented as holding a bow in one hand and a horn in the other."

"Well, that fits. What will we call the natives; Svantovitians, or Svantovese?"

"Well, Paul wanted to call them Svantovese, but Luis persuaded him to call them Svants. He said everybody'd call them that, anyhow, so we

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might as well make it official from the start."

"We can call the language Svantovese," Lillian decided. "After dinner, I am going to start playing back recordings and running off audiovisuals. I will be so happy to know that I have a name for what I'm studying. Probably be all I will know."

After dinner, he and Karl and Paul went into a huddle on what sort of gifts to give the natives, and the advisability of trading with them, and for what. Nothing too far in advance of their present culture level. Wheels; they could be made in the fabricating shop aboard the ship.

"You know, it's odd," Karl Dorver said. "These people here have never seen a wheel, and, except in documentary or historical-drama films, neither have a lot of Terrans."

That was true. As a means of transportation, the wheel had been completely obsolete since the development of contragravity, six centuries ago. Well, a lot of Terrans in the Year Zero had never seen a suit of armor, or an harquebus, or even a tinder box or a spinning wheel.

Wheelbarrows; now there was something they'd find useful. He screened Max Milzer, in charge of the fabricating and repair shops on the ship. Max had never even heard of a wheelbarrow.

"I can make them up, Mark; better send me some drawings, though. Did you just invent it?"

"As far as I know, a man named Leonardo da Vinci invented it, in the Sixth Century Pre-Atomic. How soon can you get me half a dozen of them?"

"Well, let's see. Welded sheet metal, and pipe for the frame and handles. I'll have some of them for you by noon tomorrow. Now, about hoes; how tall are these people, and how long are their arms, and how far can they stoop over?"

They were all up late, that night. So were the Svants; there was a fire burning in the middle of the village, and watch-fires along the edge of the mound. Luis Gofredo was just as distrustful of them as they were of the Terrans; he kept the camp lighted, a strong guard on the alert, and the area of darkness beyond infra-red lighted and covered by photoelectric sentries on the ground and snoopers in the air. Like Paul Meillard, Luis Gofredo was a worrier and a pessimist. Everything happened for the worst in this worst of all possible galaxies, and if anything could conceivably go wrong, it infallibly would. That was probably why he was still alive and had never had a command massacred.

The wheelbarrows, four of them, came down from the ship by midmorning. With them came a grindstone, a couple of crosscut saws, and a lot of picks and shovels and axes, and cases of sheath knives and mess gear and miscellaneous trade goods, including a lot of the empty wine and whisky bottles that had been hoarded for the past four years.

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At lunch, the talk was almost exclusively about the language problem. Lillian Ransby, who had not gotten to sleep before sunrise and had just gotten up, was discouraged.

"I don't know what we're going to do next," she admitted. "Glenn Orent and Anna and I were on it all night, and we're nowhere. We have about a hundred wordlike sounds isolated, and twenty or so are used repeatedly, and we can't assign a meaning to any of them. And none of the Svants ever reacted the same way twice to anything we said to them. There's just no one-to-one relationship anywhere."

"I'm beginning to doubt they have a language," the Navy intelligence officer said. "Sure, they make a lot of vocal noise. So do chipmunks."

"They have to have a language," Anna de Jong declared. "No sapient thought is possible without verbalization."

"Well, no society like that is possible without some means of communication," Karl Dorver supported her from the other flank. He seemed to have made that point before. "You know," he added, "I'm beginning to wonder if it mightn't be telepathy."

He evidently hadn't suggested that before. The others looked at him in surprise. Anna started to say, "Oh, I doubt if—" and then stopped.

"I know, the race of telepaths is an old gimmick that's been used in new-planet adventure stories for centuries, but maybe we've finally found one."

"I don't like it, Karl," Loughran said. "If they're telepaths, why don't they understand us? And if they're telepaths, why do they talk at all? And you can't convince me that this boodly-oodly-doodle of theirs isn't talking."

"Well, our neural structure and theirs won't be nearly alike," Fayon said. "I know, this analogy between telepathy and radio is full of holes, but it's good enough for this. Our wave length can't be picked up with their sets."

"The deuce it can't," Gofredo contradicted. "I've been bothered about that from the beginning. These people act as though they got meaning *from* us. Not the meaning we intend, but some meaning. When Paul made the gobbledygook speech, they all reacted in the same way—frightened, and then defensive. The you-me routine simply bewildered them, as we'd be at a set of semantically lucid but self-contradictory statements. When Lillian tried to introduce herself, they were shocked and horrified . . ."

"It looked to me like actual physical disgust," Anna interpolated.

"When I tried it, they acted like a lot of puppies being petted, and when Mark tried it, they were simply baffled. I watched Mark explaining that steel knives were dangerously sharp; they got the demonstration, but when he tried to tie words onto it, it threw them completely."

"ALL RIGHT. Pass that," Loughran conceded. "But if they have telepathy, why do they use spoken words?"

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"Oh, I can answer that," Anna said. "Say they communicated by speech originally, and developed their telepathic faculty slowly and without realizing it. They'd go on using speech, and since the message would be received telepathically ahead of the spoken message, nobody would pay any attention to the words as such. Everybody would have a spoken language of his own; it would be sort of the instrumental accompaniment to the song."

"Some of them don't bother speaking," Karl nodded. "They just toot."

"I'll buy that, right away," Loughran agreed. "In mating, or in group-danger situations, telepathy would be a race-survival characteristic. It would be selected for genetically, and the non-gifted strains would tend to die out."

It wouldn't do. It wouldn't do at all. He said so.

"Look at their technology. We either have a young race, just emerged from savagery, or an old, stagnant race. All indications seem to favor the latter. A young race would not have time to develop telepathy as Anna suggests. An old race would have gone much farther than these people have. Progress is a matter of communication and pooling ideas and discoveries. Make a trend-graph of technological progress on Terra; every big jump comes after an improvement in communications. The printing press; railways and steamships; the telegraph; radio. Then think how telepathy would speed up progress."

The sun was barely past noon meridian before the Svants, who had ventured down into the fields at sunrise, were returning to the mound-village. In the snooper-screen, they could be seen coming up in tunics and breechclouts, entering houses, and emerging in long robes. There seemed to be no bows or spears in evidence, but the big horn sounded occasionally. Paul Meillard was pleased. Even if it had been by sign-talk, which he rated with worm-fishing for trout or shooting sitting rabbits, he had gotten something across to them.

When they went to the village, at 1500, they had trouble getting their lorry down. A couple of Marines in a jeep had to go in first to get the crowd out of the way. Several of the locals, including the one with the staff, joined with them; this quick co-operation delighted Meillard. When they had the lorry down and were all out of it, the dignitary with the staff, his scarlet tablecloth over his yellow robe, began an oration, apparently with every confidence that he was being understood. In spite of his objections at lunch, the telepathy theory was beginning to seem more persuasive.

"Give them the Shooting of Dan McJabberwock again," he told Meillard. "This is where we came in yesterday."

Something Meillard had noticed was exciting him. "Wait a moment. They're going to do something."

They were indeed. The one with

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the staff and three of his henchmen advanced. The staff bearer touched himself on the brow. *"Fwoonk,"* he said. Then he pointed to Meillard. *"Hoonkle,"* he said.

"They got it!" Lillian was hugging herself joyfully. "I knew they ought to!"

Meillard indicated himself and said, *"Fwoonk."*

That wasn't right. The village elder immediately corrected him. The word, it seemed, was, *"Fwoonk."*

His three companions agreed that that was the word for self, but that was as far as the agreement went. They rendered it, respectively, as *"Pwink," "Tweelt"* and *"Kroosh."*

Gofredo gave a barking laugh. He was right; anything that could go wrong would go wrong. Lillian used a word; it was not a ladylike word at all. The Svants looked at them as though wondering what could possibly be the matter. Then they went into a huddle, arguing vehemently. The argument spread, like a ripple in a pool; soon everybody was twittering vocally or blowing on flutes and Panpipes. Then the big horn started blaring. Immediately, Gofredo snatched the handphone of his belt radio and began speaking urgently into it.

"What are you doing, Luis?" Meillard asked anxiously.

"Calling the reserve in. I'm not taking chances on this." He spoke again into the phone, then called over his shoulder: "Rienet; three one-second bursts, in the air!"

A Marine pointed a submachine gun skyward and ripped off a string of shots, then another, and another. There was silence after the first burst. Then a frightful howling arose.

"Luis, you imbecile!" Meillard was shouting.

Gofredo jumped onto the top of an airjeep, where they could all see him; drawing his pistol, he fired twice into the air.

"Be quiet, all of you!" he shouted, as though that would do any good.

It did. Silence fell, bounced noisily, and then settled over the crowd. Gofredo went on talking to them: "Take it easy, now; easy." He might have been speaking to a frightened dog or a fractious horse. "Nobody's going to hurt you. This is nothing but the great noise-magic of the Terrans . . ."

"Get the presents unloaded," Meillard was saying. "Make a big show of it. The table first."

The horn, which had started, stopped blowing. As they were getting off the long table and piling it with trade goods, another lorry came in, disgorging twenty Marine riflemen. They had their bayonets fixed; the natives looked apprehensively at the bare steel, but went on listening to Gofredo. Meillard pulled the (Lord Mayor? Archbishop? Lord of the Manor?) aside, and began making sign-talk to him.

When quiet was restored, Howell put a pick and shovel into a wheelbarrow and pushed them out into the space that had been cleared in front of the table. He swung the pick for a while, then shoveled the barrow full

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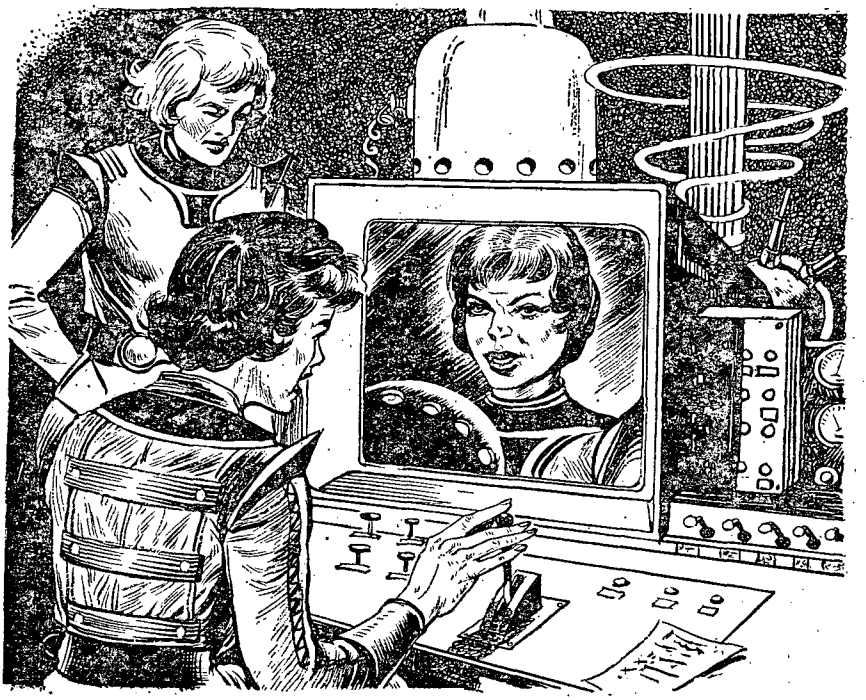
of ground. After pushing it around for a while, he dumped it back in the hole and leveled it off. Two Marines brought out an eight-inch log and chopped a couple of billets off it with an ax, then cut off another with one of the saws, split them up, and filled the wheelbarrow with the firewood.

The knives, jewelry and other small items would be no problem; they had enough of them to go around. The other stuff would be harder to distribute, and Paul Meillard and Karl Dorver were arguing about how to handle it. If they weren't careful, a lot of new bowie knives would get bloodied.

"Have them form a queue," Anna suggested. "That will give them the idea of equal sharing, and we'll be able to learn something about their status levels and social hierarchy and agonistic relations."



We can't use the computer till we can tell it what the data is data about!

The one with the staff took it as a matter of course that he would go first; his associates began falling in

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behind him, and the rest of the villagers behind them. Whether they'd gotten one the day before or not, everybody was given a knife and a bandanna and one piece of flashy junk-jewelry, also a stainless steel cup and mess plate, a bucket, and an empty bottle with a cork. The women didn't carry sheath knives, so they got Boy Scout knives on lanyards. They were all lavishly supplied with Extee Three and candy. Any of the children who looked big enough to be trusted with them got knives too, and plenty of candy.

Anna and Karl were standing where the queue was forming, watching how they fell into line; so was Lillian, with an audiovisual camera. Having seen that the Marine enlisted men were getting the presents handed out properly, Howell strolled over to them. Just as he came up, a couple approached hesitantly, a man in a breechclout under a leather apron, and a woman, much smaller, in a ragged and soiled tunic. As soon as they fell into line, another Svant, in a blue robe, pushed them aside and took their place.

"Here, you can't do that!" Lillian cried. "Karl, make him step back."

Karl was saying something about social status and precedence. The couple tried to get into line behind the man who had pushed them aside. Another villager tried to shove them out of his way. Howell advanced, his right fist closing. Then he remembered that he didn't know what he'd be punching; he might break the fellow's neck, or his own knuckles. He grabbed the blue-robed Svant by the wrist with both hands, kicked a foot out from under him, and jerked, sending him flying for six feet and then sliding in the dust for another couple of yards. He pushed the others back, and put the couple into place in the line.

"Mark, you shouldn't have done that," Dorver was expostulating. "We don't know . . ."

The Svant sat up, shaking his head groggily. Then he realized what had been done to him. With a snarl of rage, he was on his feet, his knife in his hand. It was a Terran bowie knife. Without conscious volition, Howell's pistol was out and he was thumbing the safety off.

The Svant stopped short, then dropped the knife, ducked his head, and threw his arms over it to shield his comb. He backed away a few steps, then turned and bolted into the nearest house. The others, including the woman in the ragged tunic, were twittering in alarm. Only the man in the leather apron was calm; he was saying, tonelessly, *"Ghrooogh-ghrooogh."*

Luis Gofredo was coming up on the double, followed by three of his riflemen.

"What happened, Mark? Trouble?"

"All over now." He told Gofredo what had happened. Dorver was still objecting:

". . . Social precedence; the Svant may have been right, according to local customs."

"Local customs be damned!" Go-

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fredo became angry. "This is a Terran Federation handout; we make the rules, and one of them is, no pushing people out of line. Teach the buggers that now and we won't have to work so hard at it later." He called back over his shoulder, "Situation under control; get the show going again."

The natives were all grimacing heartbrokenly with pleasure. Maybe the one who got thrown on his ear—no, he didn't have any—was not one of the more popular characters in the village.

"You just pulled your gun, and he dropped the knife and ran?" Gofredo asked. "And the others were scared, too?"

"That's right. They all saw you fire yours; the noise scared them."

Gofredo nodded. "We'll avoid promiscuous shooting, then. No use letting them find out the noise won't hurt them any sooner than we have to."

Paul Meillard had worked out a way to distribute the picks and shovels and axes. Considering each house as representing a family unit, which might or might not be the case, there were picks and shovels enough to go around, and an ax for every third house. They took them around in an airjeep and left them at the doors. The houses, he found, weren't adobe at all. They were built of logs, plastered with adobe on the outside. That demolished his theory that the houses were torn down periodically, and left the mound itself unexplained.

The wheelbarrows and the grindstone and the two crosscut saws were another matter. Nobody was quite sure that the (nobility? capitalist-class? politicians? prominent citizens?) wouldn't simply appropriate them for themselves. Paul Meillard was worried about that; everybody else was willing to let matters take their course. Before they were off the ground in their vehicles, a violent dispute had begun, with a bedlam of jabbering and shrieking. By the time they were landing at the camp, the big laminated leather horn had begun to bellow.

One of the huts had been fitted as contact-team headquarters, with all the view and communication screens installed, and one end partitioned off and soundproofed for Lillian to study recordings in. It was cocktail time when they returned; conversationally, it was a continuation from lunch. Karl Dorver was even more convinced than ever of his telepathic hypothesis, and he had completely converted Anna de Jong to it.

"Look at that." He pointed at the snooper screen, which gave a view of the plaza from directly above. "They're reaching an agreement already."

So they seemed to be, though upon what was less apparent. The horn had stopped, and the noise was diminishing. The odd thing was that peace was being restored, or was restoring itself, as the uproar had begun—outwardly from the center of the plaza to the periphery of the

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crowd. The same thing had happened when Gofredo had ordered the submachine gun fired, and, now that he recalled, when he had dealt with the line-crasher.

"Suppose a few of them, in the middle, are agreed," Anna said. "They are all thinking in unison, combining their telepathic powers. They dominate those nearest to them, who join and amplify their telepathic signal, and it spreads out through the whole group. A mental chain-reaction."

"That would explain the mechanism of community leadership, and I'd been wondering about that," Dorver said, becoming more excited. "It's a mental aristocracy; an especially gifted group of telepaths, in agreement and using their powers in concert, implanting their opinions in the minds of all the others. I'll bet the purpose of the horn is to distract the thoughts of the others, so that they can be more easily dominated. And the noise of the shots shocked them out of communication with each other; no wonder they were frightened."

Bennet Fayon was far from convinced. "So far, this telepathy theory is only an assumption. I find it a lot easier to assume some fundamental difference between the way they translate sound into sense-data and the way we do. We *think* those combs on top of their heads are their external hearing organs, but we have no idea what's back of them, or what kind of a neural hookup is connected to them. I wish I knew how these people dispose of their dead. I need a couple of fresh cadavers. Too bad they aren't warlike. Nothing like a good bloody battle to advance the science of anatomy, and what we don't know about Svant anatomy is practically the entire subject."

"I should imagine the animals hear in the same way," Meillard said. "When the wagon wheels and the hoes and the blacksmith tools come down from the ship, we'll trade for cattle."

"When they make the second landing in the mountains, I'm going to do a lot of hunting," Loughran added. "I'll get wild animals for you."

"Well, I'm going to assume that the vocal noises they make are meaningful speech," Lillian Ransby said. "So far, I've just been trying to analyze them for phonetic values. Now I'm going to analyze them for sound-wave patterns. No matter what goes on inside their private nervous systems, the sounds exist as waves in the public atmosphere. I'm going to assume that the Lord Mayor and his stooges were all trying to say the same thing when they were pointing to themselves, and I'm going to see if all four of those sounds have any common characteristic."

By the time dinner was over, they were all talking in circles, none of them hopefully. They all made recordings of the speech about the slithy toves in the Malemute Saloon; Lillian wanted to find out what was different about them. Luis Gofredo saw to it that the camp itself would

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be visible-lighted, and beyond the lights he set up more photoelectric robot sentries and put a couple of snoopers to circling on contragravity, with infra-red lights and receptors. He also insisted that all his own men and all Dave Questell's Navy construction engineers keep their weapons ready to hand. The natives in the village were equally distrustful. They didn't herd the cattle up from the meadows where they had been pastured, but they lighted watchfires along the edge of the mound as soon as it became dark.

It was three hours after nightfall when something on the indicator-board for the robot sentries went off like a startled rattlesnake. Everybody, talking idly or concentrating on writing up the day's observations, stiffened. Luis Gofredo, dozing in a chair, was on his feet instantly and crossing the hut to the instruments. His second-in-command, who had been playing chess with Willi Schallenmacher, rose and snatched his belt from the back of his chair, putting it on.

"Take it easy," Gofredo said. "Probably just a cow or a horse—local equivalent—that's strayed over from the other side."

He sat down in front of one of the snooper screens and twisted knobs on the remote controls. The monochrome view, transformed from infra red, rotated as the snooper circled and changed course. The other screen showed the camp receding and the area around it widening as its snooper gained altitude.

"It's not a big party," Gofredo was saying. "I can't see—Oh, yes I can. Only two of them."

The humanoid figures, one large than the other, were moving cautiously across the fields, crouching low. The snooper went down toward them, and then he recognized them. The man and woman whom the blue-robed villager had tried to shove out of the queue, that afternoon. Gofredo recognized them, too.

"Your friends, Mark. Harry," he told his subordinate, "go out and pass the word around. Only two, and we think they're friendly. Keep everybody out of sight; we don't want to scare them away."

The snooper followed closely behind them. The man was no longer wearing his apron; the woman's tunic was even more tattered and soiled. She was leading him by the hand. Now and then, she would stop and turn her head to the rear. The snooper over the mound showed nothing but half a dozen fire-watchers dozing by their fires. Then the pair were at the edge of the camp lights. As they advanced, they seemed to realize that they had passed a point-of-no-return. They straightened and came forward steadily, the woman seeming to be guiding her companion.

"What's happening, Mark?"

It was Lillian; she must have just come out of the soundproof speech-lab.

"You know them; the pair in the queue, this afternoon. I think we've

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annexed a couple of friendly natives."

They all went outside. The two natives, having come into the camp, had stopped. For a moment, the man in the breechclout seemed undecided whether he was more afraid to turn and run than advance. The woman, holding his hand, led him forward. They were both bruised, and both had minor cuts, and neither of them had any of the things that had been given to them that afternoon.

"Rest of the gang beat them up and robbed them," Gofredo began angrily.

"See what you did?" Dorver began. "According to their own customs, they had no right to be ahead of those others, and now you've gotten them punished for it."

"I'd have done more to that fellow then Mark did, if I'd been there when it happened." The Marine officer turned to Meillard. "Look, this is your show, Paul; how you run it is your job. But in your place, I'd take that pair back to the village and have them point out who beat them up, and teach the whole gang of them a lesson. If you're going to colonize this planet, you're going to have to establish Federation law, and Federation law says you mustn't gang up on people and beat and rob them. We don't have to speak Svantese to make them understand what we'll put up with and what we won't."

"Later, Luis. After we've gotten a treaty with somebody." Meillard broke off. "Watch this!"

The woman was making sign-talk. She pointed to the village on the mound. Then, with her hands, she shaped a bucket like the ones that had been given to them, and made a snatching gesture away from herself. She indicated the neckcloths, and the sheath knife and the other things, and snatched them away too. She made beating motions, and touched her bruises and the man's. All the time, she was talking excitedly, in a high, shrill voice. The man made the same *ghroogh-ghroogh* noises that he had that afternoon.

"No; we can't take any punitive action. Not now," Meillard said. "But we'll have to do something for them."

Vengeance, it seemed, wasn't what they wanted. The woman made vehement gestures of rejection toward the village, then bowed, placing her hands on her brow. The man imitated her obeisance, then they both straightened. The woman pointed to herself and to the man, and around the circle of huts and landing craft. She began scuttling about, picking up imaginary litter and sweeping with an imaginary broom. The man started pounding with an imaginary hammer, then chopping with an imaginary ax.

Lillian was clapping her hands softly. "Good; got it the first time. 'You let us stay; we work for you.' How about it, Paul?"

Meillard nodded. "Punitive action's unadvisable, but we will show our attitude by taking them in. You tell them, Luis; these people seem to like your voice."

Gofredo put a hand on each of

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their shoulders. "You . . . stay . . . with us." He pointed around the camp. "You . . . stay . . . this . . .place."

Their faces broke into that funny just-before-tears expression that meant happiness with them. The man confined his vocal expressions to his odd *ghroogh-ghroogh*-ing; the woman twittered joyfully. Gofredo put a hand on the woman's shoulder, pointed to the man and from him back to her. "Unh?" he inquired.

The woman put a hand on the man's head, then brought it down to within a foot of the ground. She picked up the imaginary infant and rocked it in her arms, then set it down and grew it up until she had her hand on the top of the man's head again.

"That was good, Mom," Gofredo told her. "Now, you and Sonny come along; we'll issue you equipment and find you billets." He added, "What in blazes are we going to feed them; Extee Three?"

They gave them replacements for all the things that had been taken away from them. They gave the man a one-piece suit of Marine combat coveralls; Lillian gave the woman a lavender bathrobe, and Anna contributed a red scarf. They found them quarters in one end of a store shed, after making sure that there was nothing they could get at that would hurt them or that they could damage. They gave each of them a pair of blankets and a pneumatic mattress, which delighted them, although the cots puzzled them at first.

"What do you think about feeding them, Bennet?" Meillard asked, when the two Svants had gone to bed, and they were back in the headquarters hut. "You said the food on this planet is safe for Terrans."

"So I did, and it is, but the rule's not reversible. Things we eat might kill them," Fayon said. "Meats will be especially dangerous. And no caffein, and no alcohol."

"Alcohol won't hurt them," Schallenmacher said. "I saw big jars full of fermenting fruit-mash back of some of those houses; in about a year, it ought to be fairly good wine. C_2H_5OH is the same on any planet."

"Well, we'll get native foodstuffs tomorrow," Meillard said. "We'll have to do that by signs, too," he regretted.

"Get Mom to help you; she's pretty sharp," Lillian advised. "But I think Sonny's the village half-wit."

Anna de Jong agreed. "Even if we don't understand Svant psychology, that's evident; he's definitely subnormal. The way he clings to his mother for guidance is absolutely pathetic. He's a mature adult, but mentally he's still a little child."

"That may explain it!" Dorver cried. "A mental defective, in a community of telepaths, constantly invading the minds of others with irrational and disgusting thoughts; no wonder he is rejected and persecuted. And in a community on this culture level, the mother of an abnormal child is often regarded with superstitious detestation—"

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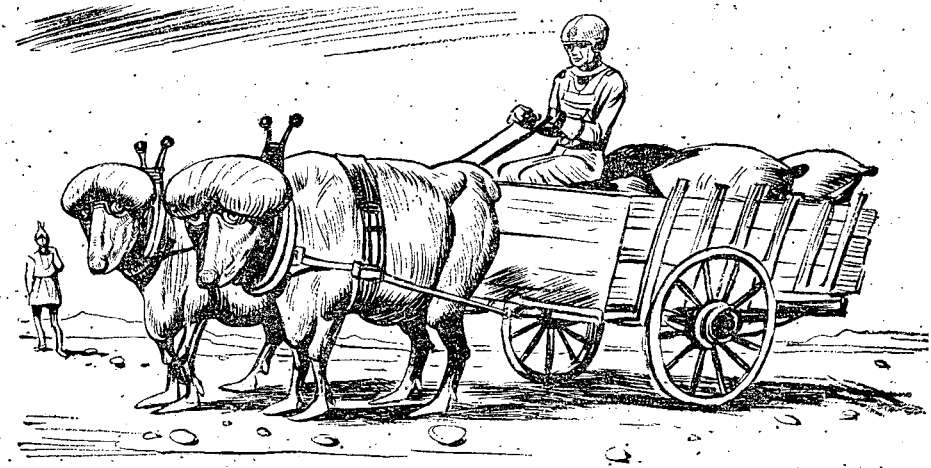

"Yes, of course!" Anna de Jong instantly agreed, and began to go into the villagers' hostility to both mother and son; both of them were now taking the telepathy hypothesis for granted.

Well, maybe so. He turned to Lillian.

"What did you find out?"

"Well, there is a common characteristic in all four sounds. A little patch on the screen at seventeen-twenty cycles. The odd thing is that when I try to repeat the sound, it isn't there."

Odd indeed. If a Svant said something, he made sound waves; if she imitated the sound, she ought to imitate the wave pattern. He said so, and she agreed.

"But come back here and look at this," she invited.

She had been using a visibilizing analyzer; in it, a sound was broken by a set of filters into frequency-groups, translated into light from dull red too violet paling into pure white. It photographed the light-pattern on high-speed film, automatically developed it, and then made a print-copy and projected the film in slow motion on a screen. When she pressed a button, a recorded voice said, *"Fwoonk."* An instant later, a pattern of vertical lines in various colors and lengths was projected on the screen.

"Those green lines," she said. "That's it. Now, watch this."

She pressed another button, got the photoprint out of a slot, and propped it beside the screen. Then she picked up a hand-phone and said, *"Fwoonk,"* into it. It sounded like the first one, but the pattern that danced onto the screen was quite different. Where the green had been, there was a patch of pale-blue lines. She ran the other three Svants' voices, each saying, presumably, "Me." Some were mainly up in blue, others had a good deal of yellow

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and orange, but they all had the little patch of green lines.

"Well, that seems to be the information," he said. "The rest is just noise."

"Maybe one of them is saying, 'John Doe, *me,* son of Joe Blow,' and another is saying, 'Tough guy, *me;* lick anybody in town.'"

"All in one syllable?" Then he shrugged. How did he know what these people could pack into one syllable? He picked up the handphone and said, "Fwoonk," into it. The pattern, a little deeper in color and with longer lines, was recognizably like hers, and unlike any of the Svants'.

The others came in, singly and in pairs and threes. They watched the colors dance on the screen to picture the four Svant words which might or might not all mean *me.* They tried to duplicate them. Luis Gofredo and Willi Schallenmacher came closest of anybody. Bennet Fayon was still insisting that the Svants had a perfectly comprehensible language—to other Svants. Anna de Jong had started to veer a little away from the Dorver Hypothesis. There was a difference between event-level sound, which was a series of waves of alternately crowded and rarefied molecules of air, and object-level sound, which was an auditory sensation inside the nervous system, she admitted. That, Fayon crowed, was what he'd been saying all along; their auditory system was probably such that *fwoonk* and *pwink* and *tweelt* and *kroosh* all sounded alike to them.

By this time, *fwoonk* and *pwink* and *tweelt* and *kroosh* had become swear words among the joint Space Navy-Colonial Office contact team.

"Well, if I hear the two sounds alike, why doesn't the analyzer hear them alike?" Karl Dorver demanded.

"It has better ears than you do, Karl. Look how many different frequencies there are in that word, all crowding up behind each other," Lillian said. "But it isn't sensitive or selective enough. I'm going to see what Ayesha Keithley can do about building me a better one."

Ayesha was signals and detection officer on the *Hubert Penrose.* Dave Questell mentioned that she'd had a hard day, and was probably making sack-time, and she wouldn't welcome being called at 0130. Nobody seemed to have realized that it had gotten that late.

"Well, I'll call the ship and have a recording made for her for when she gets up. But till we get something that'll sort this mess out and make sense of it, I'm stopped."

"You're stopped, period, Lillian," Dorver told her. "What these people gibber at us doesn't even make as much sense as the Shooting of Dan McJabberwock. The real information is conveyed by telepathy."

Lieutenant j.g. Ayesha Keithley was on the screen the next morning while they were eating breakfast. She was a blonde, like Lillian.

"I got your message; you seem to have problems, don't you?"

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"Speaking conservatively, yes. You see what we're up against?"

"You don't know what their vocal organs are like, do you?" the girl in naval uniform in the screen asked.

Lillian shook her head. "Bennet Fayon's hoping for a war, or an epidemic, or something to break out, so that he can get a few cadavers to dissect."

"Well, he'll find that they're pretty complex," Ayesha Keithley said. "I identified stick-and-slip sounds and percussion sounds, and plucked-string sounds, along with the ordinary hiss-and-buzz speech-sounds. Making a vocoder to reproduce that speech is going to be fun. Just what are you using, in the way of equipment?"

Lillian was still talking about that when the two landing craft from the ship were sighted, coming down. Charley Loughran and Willi Schallenmacher, who were returning to the *Hubert Penrose* to join the other landing party, began assembling their luggage. The others went outside, Howell among them.

Mom and Sonny were watching the two craft grow larger and closer above, keeping close to a group of spacemen; Sonny was looking around excitedly, while Mom clung to his arm, like a hen with an oversized chick. The reasoning was clear —these people knew all about big things that came down out of the sky and weren't afraid of them; stick close to them, and it would be perfectly safe. Sonny saw the contact team emerging from their hut and grabbed his mother's arm, pointing. They both beamed happily; that expression didn't look sad, at all, now that you knew what it meant. Sonny began ghroogh-ghrooghing hideously; Mom hushed him with a hand over his mouth, and they both made eating gestures, rubbed their abdomens comfortably, and pointed toward the mess hut. Bennet Fayon was frightened. He turned and started on the double toward the cook, who was standing in the doorway of the hut, calling out to him.

The cook spoke inaudibly. Fayon stopped short. "Unholy Saint Beelzebub, no!" he cried. The cook said something in reply, shrugging. Fayon came back, talking to himself.

"Terran carniculture pork," he said, when he returned. "Zarathustra pool-ball fruit. Potato-flour hotcakes, with Baldur honey and Odin flameberry jam. And two big cups of coffee apiece. It's a miracle they aren't dead now. If they're alive for lunch, we won't need to worry about feeding them anything we eat, but I'm glad somebody else has the moral responsibility for this."

Lillian Ransby came out of the headquarters hut. "Ayesha's coming down this afternoon, with a lot of equipment," she said. "We're not exactly going to count air molecules in the sound waves, but we'll do everything short of that. We'll need more lab space, soundproofed."

"Tell Dave Questell what you want," Meillard said. "Do you really think you can get anything?"

She shrugged. "If there's anything

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there to get. How long it'll take is another question."

The two sixty-foot collapsium-armored turtles settled to the ground and went off contragravity. The ports opened, and things began being floated off on lifter-skids: framework for the water tower, and curved titanium sheets for the tank. Anna de Jong said something about hot showers, and not having to take any more sponge-baths. Howell was watching the stuff come off the other landing craft. A dozen pairs of four-foot wagon wheels, with axles. Hoes, in bundles. Scythe blades. A hand forge, with a crank-driven fan blower, and a hundred and fifty pound anvil, and sledges and cutters and swages and tongs.

Everybody was busy, and Mom and Sonny were fidgeting, gesturing toward the work with their own empty hands. *Hey, boss; whatta we gonna do?* He patted them on the shoulders.

"Take it easy." He hoped his tone would convey nonurgency. "We'll find something for you to do."

He wasn't particularly happy about most of what was coming off. Giving these Svants tools was fine, but it was more important to give them technologies. The people on the ship hadn't thought of that. These wheels, now; machined steel hubs, steel rims, tubular steel spokes, drop-forged and machined axles. The Svants wouldn't be able to copy them in a thousand years. Well, in a hundred, if somebody showed them where and how to mine iron and how to smelt and work it. And how to build a steam engine.

He went over and pulled a hoe out of one of the bundles. Blades stamped out with a power press, welded to tubular steel handles. Well, wood for hoe handles was hard to come by on a spaceship, even a battle cruiser almost half a mile in diameter; he had to admit that. And they were about two thousand per cent more efficient than the bronze scrapers the Svants used. That wasn't the idea, though. Even supposing that the first wave of colonists came out in a year and a half, it would be close to twenty years before Terran-operated factories would be in mass production for the native trade. The idea was to teach these people to make better things for themselves; give them a leg up, so that the next generation would be ready for contragravity and nuclear and electric power.

Mom didn't know what to make of any of it. Sonny did, though; he was excited, grabbing Howell's arm, pointing, saying, *"Ghroogh! "Ghroogh!"* He pointed at the wheels, and then made a stooping, lifting and pushing gesture. *Like wheelbarrow?*

"That's right." He nodded, wondering if Sonny recognized that as an affirmative sign. "Like big wheelbarrow."

One thing puzzled Sonny, though. Wheelbarrow wheels were small—his hands indicated the size—and single. These were big, and double.

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"Let me show you this, Sonny."

He squatted, took a pad and pencil from his pocket, and drew two pairs of wheels, and then put a wagon on them, and drew a quadruped hitched to it, and a Svant with a stick walking beside it. Sonny looked at the picture—Svants seemed to have pictoral sense, for which make us thankful! —and then caught his mother's sleeve and showed it to her. Mom didn't get it. Sonny took the pencil and drew another animal, with a pole travois. He made gestures. A travois dragged; it went slow. A wagon had wheels that went around; it went fast.

So Lillian and Anna thought he was the village half-wit. Village genius, more likely; the other peasants didn't understand him, and resented his superiority. They went over for a closer look at the wheels, and pushed them. Sonny was almost beside himself. Mom was puzzled, but she thought they were pretty wonderful.

Then they looked at blacksmith tools. Tongs; Sonny had never seen anything like them. Howell wondered what the Svants used to handle hot metal; probably big tweezers made by tying two green sticks together. There was an old Arabian legend that Allah had made the first tongs and given them to the first smith, because nobody could make tongs without having a pair already.

Sonny didn't understand the fan-blower until it was taken apart. Then he made a great discovery. The wheels, and the fan, and the pivoted tongs, all embodied the same principle, one his people had evidently never discovered. A whole new world seemed to open before him; from then on, he was constantly finding things pierced and rotating on pivots.

By this time, Mom was fidgeting again. She ought to be doing something to justify her presence in the camp. He was wondering what sort of work he could invent for her when Karl Dorver called to him from the door of the headquarters hut.

"Mark, can you spare Mom for a while?" he asked. "We want her to look at pictures and show us which of the animals are meat-cattle, and which of the crops are ripe."

"Think you can get anything out of her?"

"Sign-talk, yes. We may get a few words from her, too."

At first, Mom was unwilling to leave Sonny. She finally decided that it would be safe, and trotted over to Dorver, entering the hut.

Dave Questell's construction crew began at once on the water tank, using a power shovel to dig the foundation. They had to haul water in a tank from the river a quarter-mile away to mix the concrete. Sonny watched that interestedly. So did a number of the villagers, who gathered safely out of bowshot. They noticed Sonny among the Terrans and pointed at him. Sonny noticed that. He, unobtrusively picked up a double-bitted ax and kept it to hand.

He and Mom had lunch with the

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contact team. As they showed no ill effects from breakfast, Fayon decided that it was safe to let them have anything the Terrans ate or drank. They liked wine; they knew what it was, all right, but this seemed to have a delightfully different flavor. They each tried a cigarette, choked over the first few puffs, and decided that they didn't like smoking.

"Mom gave us a lot of information, as far as she could, on the crops and animals. The big things, the size of rhinoceroses, are draft animals and nothing else; they're not eaten," Dorver said. "I don't know whether the meat isn't good, or is taboo, or they are too valuable to eat. They eat all the other three species, and milk two of them. I have an idea they grind their grain in big stone mortars as needed."

That was right; he'd seen things like that.

"Willi, when you're over in the mountains, see if you can find something we can make millstones out of. We can shape them with sono-cutters; after they get the idea, they can do it themselves by hand. One of those big animals could be used to turn the mill. Did you get any words from her?"

Paul Meillard shook his head gloomily. "Nothing we can be sure of. It was the same thing as in the village, yesterday. She'd say something, I'd repeat it, and she'd tell us it was wrong and say the same thing over again. Lillian took recordings; we got the same results as last night. Ask her about it later."

"She has the same effect on Mom as on the others?"

"Yes. Mom was very polite and tried not to show it, but—"

Lillian took him aside, out of earshot of the two Svants, after lunch. She was almost distracted.

"Mark, I don't know what I'm going to do. She's like the others. Every time I open my mouth in front of her, she's simply horrified. It's as though my voice does something loathsome to her. And I'm the one who's supposed to learn to talk to them."

"Well, those who can do, and those who can't teach," he told her. "You can study recordings, and tell us what the words are and teach us how to recognize and pronounce them. You're the only linguist we have."

That seemed to comfort her a little. He hoped it would work out that way. If they could communicate with these people and did leave a party here to prepare for the first colonization, he'd stay on, to teach the natives Terran technologies and study theirs. He'd been expecting that Lillian would stay, too. She was the linguist; she'd have to stay. But now, if it turned out that she would be no help but a liability, she'd go back with the *Hubert Penrose.* Paul wouldn't keep a linguist who offended the natives' every sensibility with every word she spoke. He didn't want that to happen. Lillian and he had come to mean a little too much to each other to be parted now.

Paul Meillard and Karl Dorver had

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considerable difficulty with Mom, that afternoon. They wanted her to go with them and help trade for cattle. Mom didn't want to; she was afraid. They had to do a lot of play-acting, with half a dozen Marines pretending to guard her with fixed bayonets from some of Dave Questell's Navy construction men who had red bandannas on their heads to simulate combs before she got the idea. Then she was afraid to get into the contragravity lorry that was to carry the hoes and the wagon wheels. Sonny managed to reassure her, and insisted on going along, and he insisted on taking his ax with him. That meant doubling the guard, to make sure Sonny didn't lose his self-control when he saw his former persecutors within chopping distance.

It went off much better than either Paul Meillard or Luis Gofredo expected. After the first shock of being air-borne had worn off, Mom found that she liked contragravity-riding; Sonny was wildly delighted with it from the start. The natives showed neither of them any hostility. Mom's lavender bathrobe and Sonny's green coveralls and big ax seemed to be symbols of a new and exalted status; even the Lord Mayor was extremely polite to them.

The Lord Mayor and half a dozen others got a contragravity ride, too, to the meadows to pick out cattle. A dozen animals, including a pair of the two-ton draft beasts, were driven to the Terran camp. A couple of lorry-loads of assorted vegetables were brought in, too. Everybody seemed very happy about the deal, especially Bennet Fayon. He wanted to slaughter one of the sheep-sized meat-and-milk animals at once and get to work on it. Gofredo advised him to put it off till the next morning. He wanted a large native audience to see the animal being shot with a rifle.

The water tower was finished, and the big spherical tank hoisted on top of it and made fast. A pump, and a filter-system were installed. There was no water for hot showers that evening, though. They would have to run a pipeline to the river, and that would entail a ditch that would cut through several cultivated fields which, in turn, would provoke an uproar. Paul Meillard didn't want that happening until he'd concluded the cattle-trade.

Charley Loughran and Willi Schallenmacher had gone up to the ship on one of the landing craft; they accompanied the landing party that went down into the mountains. Ayesha Keithley arrived late in the afternoon on another landing craft with five or six tons of instrument and parts and equipment, and a mate Navy warrant-officer helper.

They looked around the lab Lillian had been using at one end of the headquarters hut.

"This won't do," the girl Navy officer said. "We can't get a quarter of the apparatus we're going to need in here. We'll have to build something."

Dave Questell was drawn into the discussion. Yes, he could put up something big enough for everything the girls would need to install

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and soundproof it. Concrete, he decided; they'd have to wait till he got the water line down and the pump going, though.

There was a crowd of natives in the fields, gaping at the Terran camp, the next morning, and Gofredo decided to kill the animal—until they learned the native name, they were calling it Domesticated Type C. It was herded out where everyone could watch, and a Marine stepped forward unslung his rifle took a kneeling position, and aimed at it. It was a hundred and fifty yards away. Mom had come out to see what was going on; Sonny and Howell, who had been consulting by signs over the construction of a wagon, were standing side by side. The Marine squeezed his trigger. The rifle banged, and the Domesticated-C bounded into the air, dropped, and kicked a few times and was still. The natives, however, missed that part of it; they were howling piteously and rubbing their heads. All but Sonny. He was just mildly surprised at what had happened to the Dom.-C.

Sonny, it would appear, was stone deaf.

As anticipated, there was another uproar later in the morning when the ditching machine started north across the meadow. A mob of Svants, seeing its relentless progress toward a field of something like turnips, gathered in front of it, twittering and brandishing implements of agriculture, many of them Terran-made.

Paul Meillard was ready for this. Two lorries went out; one loaded with Marines, who jumped off with their rifles ready. By this time, all the Svants knew what rifles would do beside make a noise. Meillard, Dorver, Gofredo and a few others got out of the other vehicle, and unloaded presents. Gofredo did all the talking. The Svants couldn't understand him, but they liked it. They also liked the presents, which included a dozen empty half-gallon rum demijohns, tarpaulins, and a lot of assorted knickknacks. The pipeline went through.

He and Sonny got the forge set up. There was no fuel for it. A party of Marines had gone out to the woods to the east to cut wood; when they got back, they'd burn some charcoal in the pit that had been dug beside the camp. Until then, he and Sonny were drawing plans for a wooden wheel with a metal tire when Lillian came out of the headquarters hut with a clipboard under her arm. She motioned to him.

"Come on over," he told her. "You can talk in front of Sonny; he won't mind. He can't hear."

"Can't hear?" she echoed. "You mean—?"

"That's right. Sonny's stone deaf. He didn't even hear that rifle going off. The only one of this gang that has brains enough to pour sand out of a boot with directions on the bottom of the heel, and he's a total linguistic loss."

"So he isn't a half-wit, after all."

"He's got an IQ close to genius

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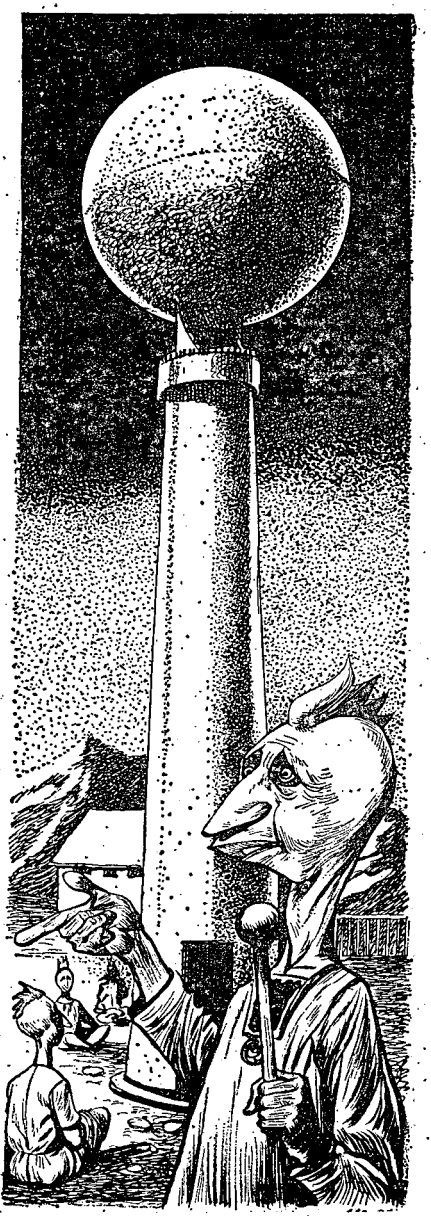
level. Look at this; he never saw a wheel before yesterday; now he's designing one."

Lillian's eyes widened. "So that's why Mom's so sharp about sign-talk. She's been doing it all his life." Then she remembered what she had come out to show him, and held out the clipboard. "You know how that analyzer of mine works? Well, here's what Ayesha's going to do. After breaking a sound into frequency bands instead of being photographed and projected, each band goes to an analyzer of its own, and is projected on its own screen. There'll be forty of them, each for a band of a hundred cycles, from zero to four thousand. That seems to be the Svant vocal range."

The diagram passed from hand to hand during cocktail time, before dinner. Bennet Fayon had been working all day dissecting the animal they were all calling a *domsee,* a name which would stick even if and when they learned the native name. He glanced disinterestedly at the drawing, then looked again, more closely. Then he set down the drink he was holding in his other hand and studied it intently.

"You know what you have here?" he asked. "This is a very close analogy to the hearing organs of that animal I was working on. The comb, as we've assumed, is the external organ. It's covered with small flaps and fissures. Back of each fissure is a long, narrow membrane; they're paired, one on each side of the comb, and from them nerves lead to clusters of small round



It's killing us it's so nice . . .

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membranes. Nerves lead from them to a complex nerve-cable at the bottom of the comb and into the brain at the base of the skull. I couldn't understand how the system functioned, but now I see it. Each of the larger membranes on the outside responds to a sound-frequency band, and the small ones on the inside break the bands down to individual frequencies."

"How many of the little ones are there?" Ayesha asked.

"Thousands of them; the inner comb is simply packed with them. Wait; I'll show you."

He rose and went away, returning with a sheaf of photo-enlargements and a number of blocks of lucite in which specimens were mounted. Everybody examined them. Anna de Jong, as a practicing psychologist, had an M.D. and to get that she'd had to know a modicum of anatomy; she was puzzled.

"I can't understand how they hear with those things. I'll grant that the membranes will respond to sound, but I can't see how they transmit it."

"But they do hear," Meillard said. "Their musical instruments, their reactions to our voices, the way they are affected by sounds like gunfire—"

"They hear, but they don't hear in the same way we do," Fayon replied. "If you can't be convinced by anything else, look at these things, and compare them with the structure of the human ear; or the ear of any member of any other sapient race we're every contacted. That's what I've been saying from the beginning."

"They have sound-perception to an extent that makes ours look almost like deafness," Ayesha Keithley said. "I wish I could design a sound-detector one-tenth as good as this must be."

Yes. The way the Lord Mayor said *fwoonk* and the way Paul Meillard said it sounded entirely different to them. Of course, *fwoonk* and *pwink* and *tweelt* and *kroosh* sounded alike to them, but let's don't be too picky about things.

There were no hot showers that evening; Dave Questell's gang had trouble with the pump and needed some new parts made up aboard the ship. They were still working on it the next morning. He had meant to start teaching Sonny blacksmithing, but during the evening Lillian and Anna had decided to try teaching Mom a nonphonetic, ideographic, alphabet; and in the morning they co-opted Sonny to help. Deprived of his disciple, he strolled over to watch the work on the pump. About twenty Svants had come in from the fields and were also watching, from the meadow.

After a while, the job was finished. The petty officer in charge of the work pushed in the switch, and the pump started, sucking dry with a harsh racket. The natives twittered in surprise. Then the water came, and the pump settled down to a steady *thugg-thugg, thugg-thugg*.

The Svants seemed to like the new sound; they grimaced in pleasure and moved closer; within forty or

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fifty feet, they all squatted on the ground and sat entranced. Others came in from the fields, drawn by the sound. They, too, came up and squatted, until there was a semicircle of them. The tank took a long time to fill; until it did, they all sat immobile and fascinated. Even after it stopped, many remained, hoping that it would start again. Paul Meillard began wondering, a trifle uneasily, if that would happen every time the pump went on.

"They get a positive pleasure from it. It affects them the same way Luis' voice does."

"Mean I have a voice like a pump?" Gofredo demanded.

"Well, I'm *going to find out*," Ayesha Keithley said. "The next time that starts, I'm going to make a recording, and compare it with your voice-recording. I'll give five to one there'll be a similarity."

Questell got the foundation for the sonics lab dug, and began pouring concrete. That took water, and the pump ran continuously that afternoon. Concrete-mixing took more water the next day, and by noon the whole village population, down to the smallest child, was massed at the pumphouse, enthralled. Mom was snared by the sound like any of the rest; only Sonny was unaffected. Lillian and Ayesha compared recordings of the voices of the team with the pump-sound; in Gofredo's they found an identical frequency-pattern.

"We'll need the new apparatus to be positive about it, but it's there, all right," Ayesha said. "That's why Luis' voice pleases them."

"That tags me; Old Pump-Mouth," Gofredo said. "It'll get all through the Corps, and they'll be calling me that when I'm a four-star general, if I live that long."

Meillard was really worried, now. So was Bennet Fayon. He said so that afternoon at cocktail time.

"It's an addiction," he declared. "Once they hear it, they have no will to resist; they just squat and listen. I don't know what it's doing to them, but I'm scared of it."

"I know one thing it's doing," Meillard said. "It's keeping them from their work in the fields. For all we know, it may cause them to lose a crop they need badly for subsistence."

The native they had come to call the Lord Mayor evidently thought so, too. He was with the others, the next morning, squatting with his staff across his knees, as bemused as any of them, but when the pump stopped he rose and approached a group of Terrans, launching into what could only be an impassioned tirade. He pointed with his staff to the pump house, and to the semicircle of still motionless villagers. He pointed to the fields, and back to the people, and to the pump house again, gesturing vehemently with his other hand.

You make the noise. My people will not work while they hear it. The fields lie untended. Stop the noise, and let my people work.

Couldn't possibly be any plainer.

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Then the pump started again. The Lord Mayor's hands tightened on the staff; he was struggling tormentedly with himself, in vain. His face relaxed into the heartbroken expression of joy; he turned and shuffled over, dropping onto his haunches with the others.

"Shut down the pump, Dave!" Meillard called out. "Cut the power off."

The *thugg-thugg*-ing stopped. The Lord Mayor rose, made an odd salaamlike bow toward the Terrans, and then turned on the people, striking with his staff and shrieking at them. A few got to their feet and joined him, screaming, pushing, tugging. Others joined. In a little while, they were all on their feet, straggling away across the fields.

Dave Questell wanted to know what it meant; Meillard explained.

"Well, what are we going to do for water?" the Navy engineer asked.

"Soundproof the pump house. You can do that, can't you?"

"Sure. Mound it over with earth. We'll have that done in a few hours."

That started Gofredo worrying. "This happens every time we colonize an inhabited planet. We give the natives something new. Then we find out it's bad for them, and we try to take it away from them. And then the knives come out, and the shooting starts."

Luis Gofredo was also a specialist, speaking on his subject.

While they were at lunch, Charley Loughran screened in from the other camp and wanted to talk to Bennet Fayon.

"A funny thing, Bennet. I took a shot at a bird . . . no, a flying mammal . . . and dropped it. It was dead when it hit the ground, but there isn't a mark on it. I want you to do an autopsy, and find out how I can kill things by missing them."

"How far away was it?"

"Call it forty feet; no more."

"What were you using, Charley?" Ayesha Keithley called from the table.

"Eight-point-five Mars-Consolidated pistol," Loughran said. "I'd laid my shotgun down and walked away from it—"

"Twelve hundred foot-seconds," Ayesha said. "Bow-wave as well as muzzle-blast."

"You think the report was what did it?" Fayon asked.

"You want to bet it didn't?" she countered.

Nobody did.

Mom was sulky. She didn't like what Dave Questell's men were doing to the nice-noise-place. Ayesha and Lillian consoled her by taking her into the soundproofed room and playing the recording of the pump-noise for her. Sonny couldn't care less, one way or another; he spent the afternoon teaching Mark Howell what the marks on paper meant. It took a lot of signs and play-acting. He had learned about thirty ideographs; by combining them and drawing little pictures, he could express a number of simple ideas.

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There was, of course, a limit to how many of those things anybody could learn and remember—look how long it took an Old Terran Chinese scribe to learn his profession—but it was the beginning of a method of communication.

Questell got the pump house mounded over. Ayesha came out and tried a sound-meter, and also Mom, on it while the pump was running. Neither reacted.

A good many Svants were watching the work. They began to demonstrate angrily. A couple tried to interfere and were knocked down with rifle butts. The Lord Mayor and his Board of Aldermen came out with the big horn and harangued them at length, and finally got them to go back to the fields. As nearly as anybody could tell, he was friendly to and co-operative with the Terrans. The snooper over the village reported excitement in the plaza.

Bennet Fayon had taken an air-jeep to the other camp immediately after lunch. He was back by 1500, accompanied by Loughran. They carried a cloth-wrapped package into Fayon's dissecting-room. At cocktail time, Paul Meillard had to go and get them.

"Sorry," Fayon said, joining the group. "Didn't notice how late it was getting. We're still doing a post on this svant-bat; that's what Charley's calling it, till we get the native name.

"The immediate cause of death was spasmodic contraction of every muscle in the thing's body; some of them were partly relaxed before we could get to work on it, but not completely. Every bone that isn't broken is dislocated; a good many both. There is not the slightest trace of external injury. Everything was done by its own muscles." He looked around. "I hope nobody covered Ayesha's bet, after I left. If they did, she collects. The large outer membranes in the comb seem to be unaffected, but there is considerable compression of the small round ones inside, in just one area, and more on the left side than on the right. Charley says it was flying across in front of him from left to right."

"The receptor-area responding to the frequencies of the report," Ayesha said.

Anna de Jong made a passing gesture toward Fayon. "The baby's yours, Bennet," she said. "This isn't psychological. I won't accept a case of psychosomatic compound fracture."

"Don't be too premature about it, Anna. I think that's more or less what you have, here."

Everybody looked at him, surprised. His subject was comparative technology. The bio- and psycho-sciences were completely outside his field.

"A lot of things have been bothering me, ever since the first contact. I'm beginning to think I'm on the edge of understanding them, now. Bennet, the higher life-forms here—the people, and that domsee, and Charley's svant-bat—are structurally identical with us. I don't mean gross

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structure, like ears and combs. I mean molecular and cellular and tissue structure. Is that right?"

Fayon nodded. "Biology on this planet is exactly Terra type. Yes. With adequate safeguards, I'd even say you could make a viable tissue-graft from a Svant to a Terran, or vice versa."

"Ayesha, would the sound waves from that pistol-shot in any conceivable way have the sort of physical effect we're considering?"

"Absolutely not," she said, and Luis Gofredo said: "I've been shot at and missed with pistols at closer range than that."

"Then it was the effect on the animal's nervous system."

Anna shrugged. "It's still Bennet's baby. I'm a psychologist, not a neurologist."

"What I've been saying, all along," Fayon reiterated complacently. "Their hearing is different from ours. This proves it.

"It proves that they don't hear at all."

He had expected an explosion; he wasn't disappointed. They all contradicted him, many derisively. Signal reactions. Only Paul Meillard made the semantically appropriate response:

"What do you mean, Mark?"

"They don't *hear* sound; they *feel* it. You all saw what they have inside their combs. Those things don't transmit sound like the ears of any sound-sensitive life-form we've ever seen. They transform sound waves into tactile sensations."

Fayon cursed, slowly and luridly. Anna de Jong looked at him wide-eyed. He finished his cocktail and poured another. In the snooper screen, what looked like an indignation meeting was making uproar in the village plaza. Gofredo cut the volume of the speaker even lower.

"That would explain a lot of things," Meillard said slowly. "How hard it was for them to realize that we didn't understand when they talked to us. A punch in the nose feels the same to anybody. They thought they were giving us bodily feelings. They didn't know we were insensible to them."

"But they do . . . they do have a language," Lillian faltered. "They talk."

"Not the way we understand it. If they want to say, 'Me,' it's *tickle-pinch-rub,* even if it sounds like *fwoonk* to us, when it doesn't sound like *pwink* or *tweelt* or *kroosh*. The tactile sensations, to a Svant, feel no more different than a massage by four different hands. Analogous to a word pronounced by four different voices, to us. They'll have a code for expressing meanings in tactile sensation, just as we have a code for expressing meanings in audible sound."

"Except that when a Svant tells another, 'I am happy,' or 'I have a stomach-ache,' he makes the other one feel that way too," Anna said. "That would carry an awful lot more conviction. I don't imagine symptom-swapping is popular among Svants. Karl! You were nearly right,

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at that. This isn't telepathy, but it's a lot like it."

"So it is," Dorver, who had been mourning his departed telepathy theory, said brightly. "And look how it explains their society. Peaceful, everybody in quick agreement—" He looked at the screen and gulped. The Lord Mayor and his party had formed one clump, and the opposition was grouped at the other side of the plaza; they were screaming in unison at each other. "They make their decisions by endurance; the party that can resist the feelings of the other longest converts their opponents."

"Pure democracy," Gofredo declared. "Rule by the party that can make the most noise."

"And I'll bet that when they're sick, they go around chanting, 'I am well; I feel just fine!'" Anna said. "Autosuggestion would really work, here. Think of the feedback, too. One Svant has a feeling. He verbalizes it, and the sound of his own voice re-enforces it in him. It is induced in his hearers, and they verbalize it, re-enforcing it in themselves and in him. This could go on and on."

"Yes. It has. Look at their technology." He felt more comfortable, now he was on home ground again. "A friend of mine, speaking about a mutual acquaintance, once said, 'When they installed her circuits, they put in such big feeling circuits that there was no room left for any thinking circuits.' I think that's a perfect description of what I estimate Svant mentality to be. Take these bronze knives, and the musical instruments. Wonderful; the work of individuals trying to express feeling in metal or wood. But get an idea like the wheel, or even a pair of tongs? Poo! How would you state the First Law of Motion, or the Second Law of Thermodynamics, in tickle-pinch-rub terms? Sonny could grasp an idea like that. Sonny's handicap, if you call it that, cuts him off from feel-thinking; he can think logically instead of sensually."

He sipped his cocktail and continued: "I can understand why the village is mounded up, too. I realized that while I was watching Dave's gang bury the pump house. I'd been bothered by that, and by the absence of granaries for all the grain they raise, and by the number of people for so few and such small houses. I think the village is mostly underground, and the houses are just entrances, soundproofed, to shelter them from uncomfortable natural noises—thunderstorms, for instance."

The horn was braying in the snooper-screen speaker; somebody wondered what it was for. Gofredo laughed.

"I thought, at first, that it was a war-horn. It isn't. It's a peace-horn," he said. "Public tranquilizer. The first day, they brought it out and blew it at us to make us peaceable."

"Now I see why Sonny is rejected and persecuted," Anna was saying. "He must make all sorts of horrible noises that he can't hear . . . that's not the word; we have none for it . . . and

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nobody but his mother can stand being near him."

"Like me," Lillian said. "Now I understand. Just think of the most revolting thing that could be done to you physically; that's what I do to them every time I speak. And I always thought I had a nice voice," she added, pathetically.

"You have, for Terrans," Ayesha said. "For Svants, you'll just have to change it."

"But how—?"

"Use an analyzer; train it. That was why I took up sonics, in the first place. I had a voice like a crow with a sore throat, but by practicing with an analyzer, an hour a day, I gave myself an entirely different voice in a couple of months. Just try to get some pump-sound frequencies into it, like Luis'."

"But why? I'm no use here. I'm a linguist, and these people haven't any language that I could ever learn, and they couldn't even learn ours. They couldn't learn to make sounds, as sounds."

"You've been doing very good work with Mom on those ideographs," Meillard said. "Keep it up till you've taught her the Lingua Terra Basic vocabulary, and with her help we can train a few more. They can be our interpreters; we can write what we want them to say to the others. It'll be clumsy, but it will work, and it's about the only thing I can think of that will."

"And it will improve in time," Ayesha added. "And we can make vocoders and visibilizers. Paul, you have authority to requisition personnel from the ship's company. Draft me; I'll stay here and work on it."

The rumpus in the village plaza was getting worse. The Lord Mayor and his adherents were being outshouted by the opposition.

"Better do something about that in a hurry, Paul, if you don't want a lot of Svants shot," Gofredo said. "Give that another half hour and we'll have visitors, with bows and spears."

"Ayesha, you have a recording of the pump," Meillard said. "Load a record-player onto a jeep and fly over the village and play it for them. Do it right away. Anna, get Mom in here. We want to get her to tell that gang that from now on, at noon and for a couple of hours after sunset, when the work's done, there will be free public pump-concerts, over the village plaza."

Ayesha and her warrant-officer helper and a Marine lieutenant went out hastily. Everybody else faced the screen to watch. In fifteen minutes, an airjeep was coming in on the village. As it circled low, a new sound, the steady *thugg-thugg, thugg-thugg* of the pump, began.

The yelling and twittering and the blaring of the peace-horn died out almost at once. As the jeep circled down to housetop level, the two contending faction-clumps broke apart; their component individuals moved into the center of the plaza and squatted, staring up, letting the

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delicious waves of sound caress them.

"Do we have to send a detail in a jeep to do that twice a day?" Gofredo asked. "We keep a snooper over the village; fit it with a loud-speaker and a timer; it can give them their *thugg-thugg,* on schedule, automatically."

"We might give the Lord Mayor a recording and a player and let him decide when the people ought to listen—if that's the word—to it," Dorver said. "Then it would be something of their own."

"No!" He spoke so vehemently that the others started. "You know what would happen? Nobody would be able to turn it off; they'd all be hypnotized, or doped, or whatever it is. They'd just sit in a circle around it till they starved to death, and when the power-unit gave out, the record-player would be surrounded by a ring of skeletons. We'll just have to keep on playing it for them ourselves. Terrans' Burden."

"That'll give us a sanction over them," Gofredo observed. "Extra *thugg-thugg* if they're very good; shut it off on them if they act nasty. And find out what Lillian has in her voice that the rest of us don't have, and make a good loud recording of that, and stash it away along with the rest of the heavy-weapons ammunition. You know, you're not going to have any trouble at all, when we go down-country to talk to the king or whatever. This is better than firewater ever was."

"We must never misuse our advantage, Luis," Meillard said seriously. "We must use it only for their good."

He really meant it. Only— You had to know some general history to study technological history, and it seemed to him that that pious assertion had been made a few times before. Some of the others who had made it had really meant it, too, but that had made little difference in the long run.

Fayon and Anna were talking enthusiastically about the work ahead of them.

"I don't know where your subject ends and mine begins," Anna was saying. "We'll just have to handle it between us. What are we going to call it? We certainly can't call it hearing."

"Nonauditory sonic sense is the only thing I can think of," Fayon said. "And that's such a clumsy term."

"Mark; you thought of it first," Anna said. "What do you think?"

"Nonauditory sonic sense. It isn't any worse than Domesticated Type C, and that got cut down to size. *Naudsonce.*"

■ ■ ■

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IDIOT SOLVANT

Anybody wanna bet that, just because a man doesn't pass your test of intelligence, he can't pass the Universe's tests . . . ?

BY GORDON R. DICKSON

The afternoon sun, shooting the gap of the missing slat in the Venetian blind on the window of Art Willoughby's small rented room, splashed fair in Art's eyes, blinding him.

"Blast!" muttered Art. "Got to do something about that sun."

He flipped one long, lean hand up as an eyeshield and leaned forward once more over the University newssheet, unaware that he had reacted with his usual gesture and litany to the sun in his eyes. His mouth watered. He spread out his sharp elbows on the experiment-scarred surface of his desk and reread the ad.

> Volunteers for medical research testing. $1.60 hr., rm., board. Dr. Henry Rapp, Room 432, A Bldg., University Hospitals.

"Board—" echoed Art aloud, once more unaware he had spoken. He licked his lips hungrily. *Food*, he thought. Plus wages. And hospital food was supposed to be good. If they would just let him have all he wanted . . .

Of course, it would be worth it for the $1.60 an hour alone.

"I'll be sensible," thought Art. "I'll put it in the

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bank and just draw out what I need. Let's see—one week's work, say—seven times twenty-four times sixteen. Two-six-eight-eight—to the tenth. Two hundred sixty-eight dollars and eighty cents . . ."

That much would support him for —mentally; he totted up his daily expenses. Ordinary expenses, that was. Room, a dollar-fifty. One and a half pound loaf of day-old bread at half price—thirteen cents. Half a pound of peanut butter, at ninety-eight cents for the three-pound economy size jar —seventeen cents roughly. One all-purpose vitamin capsule—ten cents. Half a head of cabbage, or whatever was in season and cheap—approximately twelve cents. Total, for shelter with all utilities paid and a change of sheets on the bed once a week, plus thirty-two hundred calories a day—two dollars and two cents.

Two dollars and two cents. Art sighed. Sixty dollars and sixty cents a month for mere existence. It was heartbreaking. When sixty dollars would buy a fine double magnum of imported champagne at half a dozen of the better restaurants in town, or a 1954 used set of the Encyclopedia Britannica, or the parts from a mail order house so that he could build himself a little ocean-hopper short-wave receiver so that he could tune in on foreign language broadcasts and practice understanding German, French, and Italian.

Art sighed. He had long ago come to the conclusion that since the two billion other people in the world could not very well all be out of step

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at the same time, it was probably he who was the odd one. Nowadays he no longer tried to fight the situation, but let himself reel uncertainly through life, sustained by the vague, persistent conviction that somewhere, somehow, in some strange fashion destiny would eventually be bound to call on him to have a profound effect on his fellow men.

It was a good twenty-minute walk to the university. Art scrambled lankily to his feet, snatched an ancient leather jacket off the hook holding his bagpipes, put his slide rule up on top of the poetry anthologies in the bookcase so he would know where to find it again—that being the most unlikely place, Q.E.D.—turned off his miniature electric furnace in which he had been casting up a gold pawn for his chess set, left some bread and peanut butter for his pet raccoon, now asleep in the wastebasket, and hurried off, closing the door.

". . . There's one more," said Margie Hansen, Dr. Hank Rapp's lab assistant. She hesitated. "I think you better see him." Hank looked up from his desk, surprised. He was a short, cheerful tough-faced man in his late thirties.

"Why?" he said. "Some difficulties? Don't sign him up if you don't want to."

"No. No . . : I just think maybe you better talk to him. He passed the physical all right. It's just . . . well, you have a look at him."

"I don't get it," said Hank. "But send him in."

She opened the door behind her and leaned out through it.

"Mr. Willoughby, will you come in now?" She stood aside and Art entered. "This is Dr. Rapp, Mr. Willoughby. Doctor, this is Art Willoughby." She went out rather hastily, closing the door behind her.

"Sit down," said Hank, automatically. Art sat down; and Hank blinked a little at his visitor. The young man sitting opposite him resembled nothing so much as an unbearded Abe Lincoln. A *thin* unbearded Abe Lincoln, if it was possible to imagine our sixteenth president as being some thirty pounds lighter than he actually had been.

"*Are* you a student at the University, here?" asked Hank, staring at the decrepit leather jacket.

"Well, yes," said Art, hoping the other would not ask him what college he was in. He had been in six of them, from Theater Arts to Engineering. His record in each was quite honorable. There was nothing to be ashamed of—it was just always a little bit difficult to explain.

"Well—" said Hank. He saw now why Margie had hesitated. But if the man was in good enough physical shape, there was no reason to refuse him. Hank made up his mind. "Has the purpose of this test been explained to you?"

"You're testing a new sort of stay-awake pill, aren't you?" said Art. "Your nurse told me all about it."

"Lab assistant," corrected Hank automatically. "There's no reason you can think of yourself, is there, why

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you shouldn't be one of the volunteers?"

"Well, no. I . . . I don't usually sleep much," said Art, painfully.

"That's no barrier." Hank smiled. "We'll just keep you awake until you get tired. How much do you sleep?" he asked, to put the younger man at his ease at least a little.

"Oh . . . six or seven hours."

"That's a little less than average. Nothing to get in our way . . . why, what's wrong?" said Hank, sitting up suddenly; for Art was literally struggling with his conscience, and his Abe Lincoln face was twisted unhappily.

"A . . . a week," blurted Art.

"A week! Are you—" Hank broke off, took a good look at his visitor and decided he was not kidding. Or at least, believed himself he was not kidding. "You mean, less than an hour a night?"

"Well, I usually wait to the end of the week—Sunday morning's a good time. Everybody else is sleeping then, anyway. I get it over all at once—" Art leaned forward and put both his long hands on Hank's desk, pleadingly. "But can't you test me anyway, doctor? I need this job. Really, I'm desperate. If you could use me as a control, or something—"

"Don't worry," said Hank, grimly. "You've got the job. In fact if what you say is true, you've got more of a job than the rest of the volunteers. This is something we're all going to want to see!"

Well," said Hank, ten days later. Willoughby surely wasn't kidding."

Hank was talking to Dr. Arlic Bohn, of the department of psychology. Arlic matched Hank's short height, but outdid him otherwise to the tune of some fifty pounds and fifteen years. They were sitting in Hank's office, smoking cigarettes over the remains of their bag lunches.

"You don't think so?" said Arlic, lifting blond eyebrows toward his half-bare, round skull.

"Arlie! Ten days!"

"And no hallucinations?"

"None."

"Thinks his nurses are out to poison him? Doesn't trust the floor janitor?"

"No. No. No!"

Arlie blew out a fat wad of smoke. "I don't believe it," he announced.

"I beg your pardon!"

"Oh—not you, Hank. No insults intended. But this boy of yours is running some kind of a con. Sneaking some sort of stimulant when you aren't looking."

"Why would he do that? We'd be glad to give him all the stimulants he wants. He won't take them. And even if he was sneaking something—ten days, Arlie! Ten days and he looks as if he just got up after a good eight hours in his own bed." Hank smashed his half smoked cigarette out in the ash tray. "He's not cheating. He's a freak."

"You can't be that much of a freak."

"Oh, can't you?" said Hank. "Let me tell you some more about him. Usual body temperature—about one degree above normal average."

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"Not unheard of. You know that."

"Blood pressure a hundred and five systolic, sixty-five diastolic. Pulse, fifty-five a minute. Height, six feet four, weight when he came in here a hundred and forty-two. We've been feeding him upwards of six thousand calories a day since he came in and I swear he still looks hungry. No history of childhood diseases. All his wisdom teeth. No cavities in any teeth. Shall I go on?"

"How is he mentally?"

"I checked up with the University testing bureau. They rate him in the genius range. He's started in six separate colleges and dropped out of each one. No trouble with grades. He gets top marks for a while, then suddenly stops going to class, accumulates a flock of incompletes, and transfers into something else. Arlie," said Hank, breaking off suddenly, lowering his voice and staring hard at the other, "I think we've got a new sort of man here. A mutation."

"Hank," said Arlie, crossing his legs comfortably, "when you get to be my age, you won't be so quick to think that Gabriel's going to sound the last trump in your own particular back yard. This boy's got a few physical peculiarities, he's admittedly bright, and he's conning you. You know our recent theory about sleep and sanity—"

"Of course I—"

"Suppose," said Arlie, "I lay it out for you once again. The human being deprived of sleep for any length of time beyond what he's accustomed to, begins to show signs of mental abnormality. He hallucinates. He exhibits paranoid behavior. He becomes confused, flies into reasonless rages, and overreacts emotionally to trifles."

"Arthur Willoughby doesn't."

"That's my point." Arlie held up a small, square slab of a hand. "Let me go on. How do we explain these reactions? We theorize that possibly sleep has a function beyond that of resting and repairing the body. In sleep we humans, at least, dream pretty constantly. In our dreams we act out our unhappinesses, our frustrations, our terrors. Therefore sleep, we guess, may be the emotional safety valve by which we maintain our sanity against the intellectual pressures of our lives."

"Granted," said Hank, impatiently. "But Art—"

"Now, let's take something else. The problem-solving mechanism—"

"Oh, Arlie!"

"If you didn't want my opinion, why did you ring me in on this . . . what was that you just said, Hank?"

"Nothing. Nothing."

"I will pretend I didn't hear it. As I was saying—the problem-solving mechanism. It has been assumed for centuries that man attacked his intellectual problems consciously, and consciously solved them. Recent attention to this assumption has caused us to consider an alternate viewpoint of which I may say I"—Arlie folded his hands comfortably over his bulging shirtfront—"was perhaps the earliest and strongest proponent. It may well be—I and some others now think—that Man is inherently incapable of

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consciously solving any new intellectual problem."

"The point is, Art Willoughby—what?" Hank broke off suddenly and stared across the crumpled paper bags and wax paper on his desk, at Arlie's chubby countenance. "What?"

"Incapable. Consciously." Arlie rolled the words around in his mouth. "By which I mean," he went on, with a slight grin, "Man has no *conscious* mechanism for the solution of new intellectual problems." He cocked his head at Hank, and paused.

"All right. All right!" fumed Hank. "Tell me."

"There seems to be a definite possibility," said Arlie, capturing a crumb from the piece of wax paper that had enwrapped his ham sandwich, and chewing on it thoughtfully, "that there may be more truth than poetry to the words *inspiration, illuminating flash,* and *stroke of genius.* It may well turn out that that new-problem solving mechanism is not under conscious control at all. Hm-m-m, yes. Did I tell you Marta wants me to try out one of these new all-liquid reducing diets? When a wife starts that—"

"Never mind Marta!" shouted Hank. "What about nobody being consciously capable of solving a problem?"

Arlie frowned.

"What I'm trying to say," he said, "is that when we try to solve a problem consciously, we are actually only utilizing an attention-focusing mechanism. Look, let me define a so-called 'new problem' for you—"

"One that you haven't bumped into before."

"No," said Arlie. "No. Now you're falling into a trap." He waggled a thick finger at Hank; a procedure intensely irritating to Hank, who suffered a sort of adrenalin explosion the moment he suspected anybody of lecturing down to him. "Does every hitherto undiscovered intersection you approach in your car constitute a new problem in automobile navigation? Of course not. A truly new problem is not merely some variation or combination of factors from problems you have encountered before. It's a problem that for you, at least, previously, did not even exist. It is, in fact, *a problem created by the solution of a problem of equal value in the past.*"

"All right. Say it is," scowled Hank. "Then what?"

Then," said Arlie, "a true problem must always pose the special condition that no conscious tools of education or experience yet exist for its solution. Ergo, it cannot be handled on the conscious level. The logic of conscious thought is like the limb structure of the elephant, which, though ideally adapted to allow seven tons of animal a six-and-a-half foot stride, absolutely forbids it the necessary spring to jump across a seven-foot trench that bars its escape from the zoo. For the true problem, you've got to get from hyar to thar without any stepping stone to help you across the gap that separates you from the

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solution. So, you're up against it, Hank. You're in a position where you can't fly but you got to. What do you do?"

"You tell me," glowered Hank.

"The answer's simple," said Arlie, blandly. "You fly."

"But you just said I couldn't!" Hank snapped.

"What I said," said Arlie, "was two things. (1) You can't fly. (2) You got to fly. What you're doing is clinging to (1), which forces you to toss out (2). What I'm pointing out is that you should cling to (2), which tosses out (1). Now, your conscious, experienced, logical mind *knows* you can't fly. The whole idea's silly. It won't even consider the problem. But your unconscious—aha!"

"What about my unconscious?"

"Why, your unconscious isn't tied down by any ropes of logical process like that. When it wants a solution, it just goes looking for it."

"Just like that."

"Well," Arlie frowned, "not just like that. First it has to fire up a sort of little donkey-engine of its own which we might call the intuitive mechanism. And that's where the trickiness comes in. Because the intuitive mechanism seems to be all power and no discipline. It's great usefulness comes from the fact that it operates under absolutely no restrictions—and of course this includes the restriction of control by the conscious mind. It's a sort of idiot savant . . . no, idiot solvant would be a better term." He sighed.

"So?" said Hank, after eying the fat man for a moment. "What's the use of it all? If we can't control it, what good is it?"

"What good is it?" Arlie straightened up. "Look at art. Look at science! Look at civilization. You aren't going to deny the existence of inspirations, are you? They exist—and one day we're going to find some better method of sparking them than the purely inductive process of operating the conscious, attention-focusing mechanism in hopes that something will catch."

"You think that's possible?"

"I know it's possible."

"I see," said Hank. There was a moment or so of silence in the office. "Well," said Hank, "about this little problem of my own, which I hate to bring you back to, but you did say the other day you had some ideas about this Art Willoughby. Of course, you were probably only speaking inspirationally, or perhaps I should say, without restriction by the conscious mind—"

"I was just getting to that," interrupted Arlie. "This Art Willoughby obviously suffers from what educators like to call poor work-habits. Hm-m-m, yes. Underdevelopment of the conscious, problem-focusing mechanism. He tries to get by on a purely intuitive basis. When this fails him, he is helpless. He gives up—witness his transfers from college to college. On the other hand, when it works good, it works very, very good. He has probably come up with some way of keeping himself abnormally stimulated, either externally or

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internally. The only trouble will be that he probably isn't even conscious of it, and he certainly has no control over it. He'll fall asleep any moment now. And when he wakes up you'll want him to duplicate his feat of wakefulness but he won't be able to do it."

Hank snorted disbelievingly.

"All right," said Arlie. "All right. Wait and see."

"I will," said Hank. He stood up. "Want to come along and see him? He said he was starting to get foggy this morning. I'm going to try him with the monster."

"What," wondered Arlie, ingenuously, rising, "if it puts him to sleep?"

Hank threw him a glance of pure fury.

"Monster!" commanded Hank. He, Arlie, and Margie Hansen were gathered in Art's hospital room, which was a pleasant, bedless place already overflowing with books and maps. Art, by hospital rules deprived of such things as tools and pets, had discovered an interest in the wars of Hannibal of Carthage. At the present moment he was trying to pick the truth out of the rather confused reports following Hannibal's escape from the Romans, after Antiochus had been defeated at Magnesia and surrendered his great general to Rome.

Right now, however, he was forced to lay his books aside and take the small white capsule which Margie, at Hank's order, extended to him. Art took it; then hesitated.

"Do you think it'll make me very jittery?" he asked.

"It should just wake you up," said Hank.

"I told you how I am with things like coffee. That's why I never drink coffee, or take any stimulants. Half a cup and my eyes feel like they're going to pop out of my head."

"There wouldn't," said Hank a trifle sourly, "be much point in our paying you to test out the monster if you refused to take it, now would there?"

"Oh . . . oh, no," said Art, suddenly embarrassed. "Water?"

Margie gave him a full glass and threw an unkind glance at her superior.

"If it starts to bother you, Art, you tell us right away," she said.

Art gulped the capsule down. He stood there waiting as if he expected an explosion from the region of his stomach. Nothing happened; and after a moment or two, he relaxed.

"How long does it take?" he asked.

"About fifteen minutes," said Hank.

They waited. At the end of ten minutes, Art began to brighten up and said he was feeling much more alert. At fifteen minutes, he was sparkling-eyed and cheerful; almost, in fact, bouncy.

"Awfully sorry, doctor," he said to Hank. "Awfully sorry I hesitated over taking the monster that way. It was just that coffee and things—"

"That's all right," said Hank, preparing to leave. "Margie'll take you down for tests, now."

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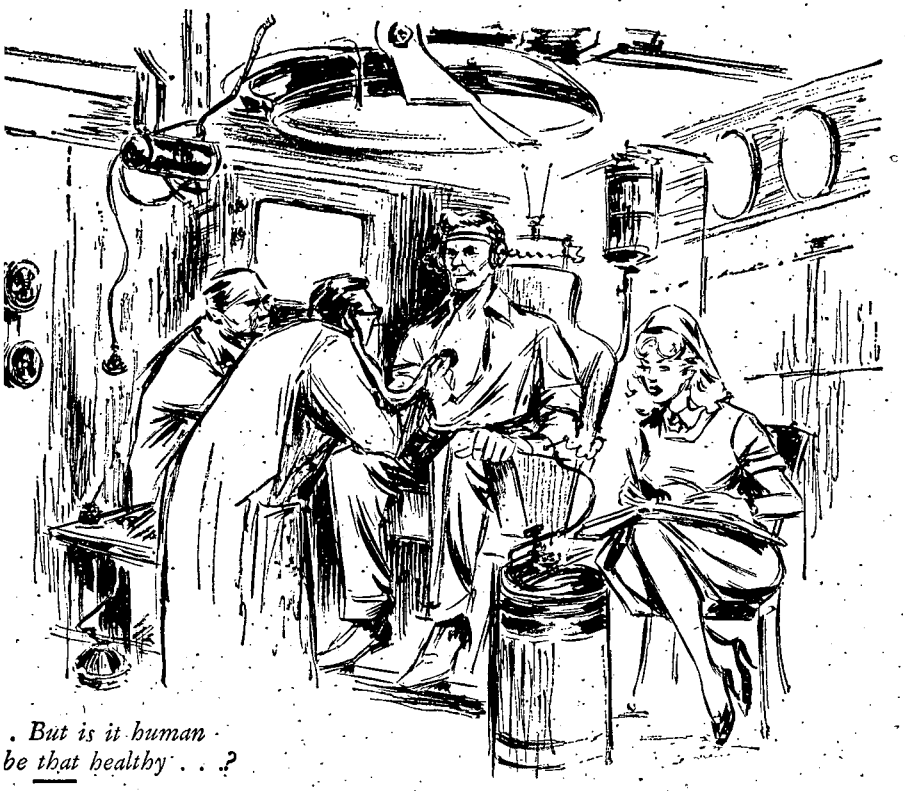

. But is it human be that healthy . . .?

"Marvelous pill. I recommend it highly," said Art, going out the door with Margie. They could hear him headed off down the corridor outside toward the laboratory on the floor below, still talking.

"Well?" said Hank.

"Time will tell," said Arlie.

"Speaking of time," continued Hank. "I've got the plug-in coffeepot back at the office. Have you got time for a quick cup?"

". . . Don't deny it," Hank was saying over half-empty cups in the office a short while later. "I heard you; I read you loud and clear. If a man makes his mind up to it, he can fly, you said."

"Not at all. And besides, I was only speaking academically," retorted Arlie, heatedly. "Just because I'm prepared to entertain fantastic notions academically doesn't mean I'm going to let you try to shove them down my throat on a practical basis. Of course nobody can fly."

"According to your ideas, someone like Willoughby could if he punched the right buttons in him."

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"Nonsense. Certainly he can't fly."

There was the wild patter of feminine feet down the hallway outside the office, the door was flung open, and Margie tottered in. She clung to the desk and gasped, too out of wind to talk.

"What's wrong?" cried Hank.

"Art—" Margie managed, "flew out—lab window."

Hank jumped to his feet, and pulled his chair out for her. She fell into it gratefully.

"Nonsense!" said Arlie. "Illusion. Or—" he scowled at Margie, "collusion of some sort."

"Got your breath back yet? What happened?" Hank was demanding. Margie nodded and drew a deep breath.

"I was testing him," she said, still breathlessly, "he was talking a blue streak and I could hardly get him to stand still. Something about Titus Quintus Flamininius, the three-body problem, Sauce Countess Waleska, the family Syrphidae of the order Diptera —all mixed up. Oh, he was babbling! And all of a sudden he dived out an open window."

"Dived?" barked Arlie. "I thought you said he *flew?*"

"Well, the laboratory's on the third floor!" wailed Margie, almost on the verge of tears.

Further questioning elicited the information that when Margie ran to the window, expecting to see a shattered ruin on the grass three stories below, she perceived Art swinging by one arm from the limb of an oak outside the window. In response to sharp queries from Arlie, she asserted vehemently that the closest grabable limb of the oak was, however, at least eight feet from the window out which Art had jumped, fallen or dived.

"And then what?" said Hank.

Then, according to Margie, Art had uttered a couple of tarzanlike yodels, and swung himself to the ground. When last seen he had been running off across the campus through the cool spring sunlight, under the budding trees, in his slacks and shirt unbuttoned at the throat. He had been heading in a roughly northeasterly direction—i.e., toward town—and occasionally bounding into the air as if from a sheer access of energy.

"Come on!" barked Hank, when he had heard this. He led the way at a run toward the hospital parking lot three stories below and his waiting car.

On the other side of the campus, at a taxi stand, the three of them picked up Art's trail. A cab driver waiting there remembered someone like Art taking another cab belonging to the same company. When Hank identified the passenger as a patient under his, Hank's, care; and further identified himself as a physician from the University hospitals, the cab driver they were talking to agreed to call in for the destination of Art's cab.

The destination was a downtown bank. Hank, Arlie and Margie piled back into Hank's car and went there.

When they arrived, they learned that Art had already come and gone,

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leaving some confusion behind him. A vice-president of the bank, it appeared, had made a loan to Art of two hundred and sixty-eight dollars and eighty cents; and was now, it seemed, not quite sure as to why he had done so.

"He just talked me into it, I guess," the vice-president was saying unhappily as Hank and the others came dashing up. It further developed that Art had had no collateral. The vice-president had been given the impression that the money was to be used to develop some confusing but highly useful discovery or discoveries concerning Hannibal, encyclopedias, the sweat fly and physics—with something about champagne and a way of preparing trout for the gourmet appetite.

A further check with the cab company produced the information that Art's taxi had taken him on to a liquor store. They followed. At the liquor store they discovered that Art had purchased the single jeroboam of champagne (Moet et Chandon) that the liquor store had on hand; and had mentioned that he was going on to a restaurant. What restaurant, the cab company was no longer able to tell them. Art's driver had just announced that he would not be answering his radio for the next half hour.

They began checking the better and closer restaurants. At the fourth one, which was called the *Calice d'Or,* they finally ran Art to ground. They found him seated alone at a large, round table, surrounded by gold-tooled leather volumes of a brand-new encyclopedia, eating and drinking what turned out to be Truite Sauce Countess Waleska and champagne from the jeroboam, now properly iced.

"Yahoo!" yelped Art, as he saw them approaching. He waved his glass on high, sloshing champagne liberally about. "Champagne for everybody! Celebrate Dr. Rapp's pill!"

"You," said Hank, "are coming back to the hospitals."

"Nonsense! Glasses! Champagne for m'friends!"

"Oh, Art!" cried Margie.

"He's fried to the gills," said Arlie.

"Not at all," protested Art. "Illuminated. Blinding flash. Understand everything. D'you know all knowledge has a common point of impingement?"

"Call a taxi, Margie," commanded Hank.

"Encyclopedia. Champagne bubble. Same thing."

"Could I help you, sir?" inquired a waiter, approaching Hank.

"We want to get our friend here home—"

"All roads lead knowledge. Unnerstand ignorance, unnerstand everything—"

"I understand, sir. Yes sir, he paid the check in advance—"

"Would *you* like to speak three thousand, four hundred and seventy-one languages?" Art was asking Arlie.

"Of course," Arlie was saying, soothingly.

"My assistant has gone to get a taxi, now. I'm Dr. Rapp of the University hospitals, and—"

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"When I was child," announced Art, "thought as child, played child; now man—put away childish things."

"Here's the young lady, sir."

"But who will take care of pet raccoon?"

"I flagged a taxi down. It's waiting out front."

"Hoist him up," commanded Hank.

He and Arlie both got a firm hold on a Willoughby arm and maneuvered Art to his feet.

"This way," said Hank, steering Art toward the door.

"The universe," said Art. He leaned confidentially toward Hank, almost toppling the three of them over. "Only two inches across."

"That so?" grunted Hank.

"Hang on to Arlie, Art, and you won't fall over. There—" said Margie. Art blinked and focused upon her with some difficulty.

"Oh . . . there you are—" he said. "Love you. Naturally. Only real woman in universe. Other four point seven to the nine hundred seventeenth women in universe pale imitations. Marry me week Tuesday, three p.m. courthouse, wear blue." Margie gasped.

"Open the door for us, will you?"

"Certainly sir," said the waiter, opening the front door to the *Calice D'Or*. A pink and gray taxi was drawn up at the curb.

"Sell stock in Wehauk Cannery immediately," Art was saying to the waiter. "Mismanagement. Collapse." The waiter blinked and stared. "News out in ten days."

"But how did you know I had—" the waiter was beginning as they shoved Art into the back seat of the cab. Margie got in after him.

"Ah, there you are," came Art's voice from the cab. "First son Charles Jonas—blond hair, blue eyes. Second son, William . . ."

"I'll send somebody to pick up that encyclopedia and anything else he left," said Hank to the waiter and got into the taxi himself. The taxi pulled away from the curb.

"Well," said the waiter, after a long pause in which he stared after the receding cab, to the doorman who had just joined him on the sidewalk, "how do you like that? Ever see anything like that before?"

"No, and I never saw anyone with over a gallon of champagne in him still walking around, either," said the doorman.

". . . And the worst of it is," said Hank to Arlie, as they sat in Hank's office, two days later, "Margie *is* going to marry him."

"What's wrong with that?" asked Arlie.

"What's wrong with it? Look at that!" Hank waved his hand at an object in the center of his desk.

"I've seen it," said Arlie.

They both examined the object. It appeared to be an ordinary movable telephone with a cord and wall plug. The plug, however, was plugged into a small cardboard box the size of a cheese carton, filled with a tangled mess of wire and parts cannibalized from a cheap portable radio. The box was plugged into nothing.

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"What was that number again . . . oh, yes," said Arlie. He picked up the phone and dialed a long series of numbers. He held the phone up so that they could both hear. There was a faint buzzing ring from the earphone and then a small, tinny voice filled the office.

". . . The time is eight forty-seven. The temperature is eighteen degrees above zero, the wind westerly at eight miles an hour. The forecast for the Anchorage area is continued cloudy and some snow with a high of twenty-two degrees, a low tonight of nine above. Elsewhere in Alaska—"

Arlie sighed, and replaced the phone in its cradle.

"We bring him back here," said Hank, "stewed to the gills. In forty minutes before he passes out, he builds this trick wastebasket of his that holds five times as much as it ought to. He sleeps seven hours and wakes up as good as ever. What should I do? Shoot him, or something? I must have some responsibility to the human race—if not to Margie."

"He seems sensible now?"

"Yes, but what do I do?"

"Hypnosis."

"You keep saying that. I don't see—"

"We must," said Arlie, "inhibit the connection of his conscious mind with the intuitive mechanism. The wall between the two—the normal wall—seems to have been freakishly thin in his case. Prolonged sleeplessness, combined with the abnormal stimulation of your monster, has caused him to break through—to say to the idiot solvant, *'Solve!'* And the idiot solvant in the back of his head has provided him with a solution."

"I still think it would be better for me to shoot him."

"You are a physician—"

"You would remind me of that. All right, so I can't shoot him. I don't even want to shoot him. But, Arlie, what's going to happen to everybody? Here I've raised up a sort of miracle worker who can probably move the North American continent down to the South Pacific if he wants to—only it just happens he's also a feather-headed butterfly who never lit on one notion for more than five minutes at a time in his life. Sure, I've got a physician's responsibility toward him. But what about my responsibility to the rest of the people in the world?"

"There is no responsibility being violated here," said Arlie patiently. "Simply put him back the way you found him."

"No miracles?"

"None. At least, except accidental ones."

"It might be kinder to shoot him."

"Nonsense," said Arlie sharply. "It's for the good of everybody." Hank sighed, and rose.

"All right," he said. "Let's go."

They went down the hall to Art's room. They found him seated thoughtfully in his armchair, staring at nothing, his books and maps ignored around him.

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"Good morning, Art," said Arlie.

"Oh? Hello," said Art, waking up. "Is it time for tests?"

"In a way," said Arlie. He produced a small box surmounted by a cardboard disk on which were inked alternate spirals of white and black. He plugged the box in to a handy electric socket by means of the cord attached to it, and set it on a small table in front of Art. The disk began to revolve. "I want you to watch that," said Arlie.

Art stared at it.

"What do you see?" asked Arlie.

"It looks like going down a tunnel," said Art.

"Indeed it does," said Arlie. "Just imagine yourself going down that tunnel. Down the tunnel. Faster and faster . . ." He continued to talk quietly and persuasively for about a minute and a half, at the end of which Art was limply demonstrating a state of deep trance. Arlie brought him up a bit for questioning.

". . . And how do these realizations, these answers come to you?" Arlie was asking, a few minutes later.

"In a sort of a flash," replied Art. "A blinding flash."

"That is the way they have always come to you?"

"More lately," said Art.

"Yes," said Arlie. "that's the way it always is just before people outgrow these flashes. They do outgrow these flashes—you know that."

There was a slight pause.

"Yes," said Art.

"You have now outgrown these flashes. You have had your last flash. Flashes belong to childhood. You have had a delayed growing-up; but from now on you will think like an adult. Logically. You will think like an adult. Repeat after me."

"I will think like an adult," intoned Art.

Arlie continued to hammer away at his point for a few more minutes; then he brought Art out of his trance, with a final command that if Art felt any tendency to a recurrence of his flashes he should return to Arlie for further help in suppressing them.

"Oh, hello, doctor," said Art to Hank, as soon as he woke up. "Say, how much longer are you going to need me as a test subject?"

Hank made a rather unhappy grimace.

"In a hurry to leave?" he said.

"I don't know," said Art, enthusiastically, rubbing his long hands together as he sat up in the chair, "but I was just thinking maybe it's time I got to work. Settled down. As long as I'm going to be a married man shortly."

"We can turn you loose today, if you want," said Hank.

When Art stepped once more into his room, closing the door behind him and taking off his leather jacket to hang it up on the hook holding his bagpipes, the place seemed so little changed that it was hard to believe ten full days had passed. Even the raccoon was back asleep in the wastebasket. It was evident the landlady had been doing her duty about

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keeping the small animal fed—Art had worried a little about that. The only difference Art thought, was that the room seemed to feel smaller.

He sighed cheerfully and sat down at the desk, drawing pencil and paper to him. The afternoon sun, shooting the gap of the missing slat on the Venetian blind at the window, splashed fair in Art's eyes, blinding him.

"Blast!" he said aloud. "Got to do something about that—"

He checked himself suddenly with one hand halfway up to shield his eyes; and smiled. Opening a drawer of the desk, he took out a pair of heavy kitchen scissors. He made a single cut into the rope slot at each end of the plastic slat at the bottom of the blind, snapped the slat out of position, and snapped it back in where the upper slat was missing.

Still smiling, he picked up the pencil and doodled the name *Margie* with a heart around it in the upper left-hand corner as he thought, with gaze abstracted. The pencil moved to the center of the piece of paper and hovered there.

After a moment, it began to sketch.

What it sketched was a sort of device to keep the sun out of Art's eyes. At the same time, however, it just happened to be a dome-shaped all-weather shield capable of protecting a city ten miles in diameter the year around. The "skin" of the dome consisted of a thin layer of carbon dioxide such as one finds in the bubbles of champagne, generated and maintained by magnetic lines of force emanating from three heavily charged bodies, in rotation about each other at the apex of the dome and superficially housed in a framework the design of which was reminiscent of the wing structure found in the family Syriphidae of the order Diptera.

Art continued to smile as the design took form. But it was a thoughtful smile, a mature smile. Hank and Arlie had been quite right about him. He had always been a butterfly, flitting from notion to notion, playing.

But then, too, he had always been a bad hypnotic subject, full of resistances.

And he was about to have a wife to care for. Consequently it is hard to say whether Arlie and Hank would have been reassured if they could have seen Art at that moment. His new thinking was indeed adult, much more so than the other two could have realized. Where miracles were concerned, he had given up *playing*.

Now, he was *working*.

■ ■ ■

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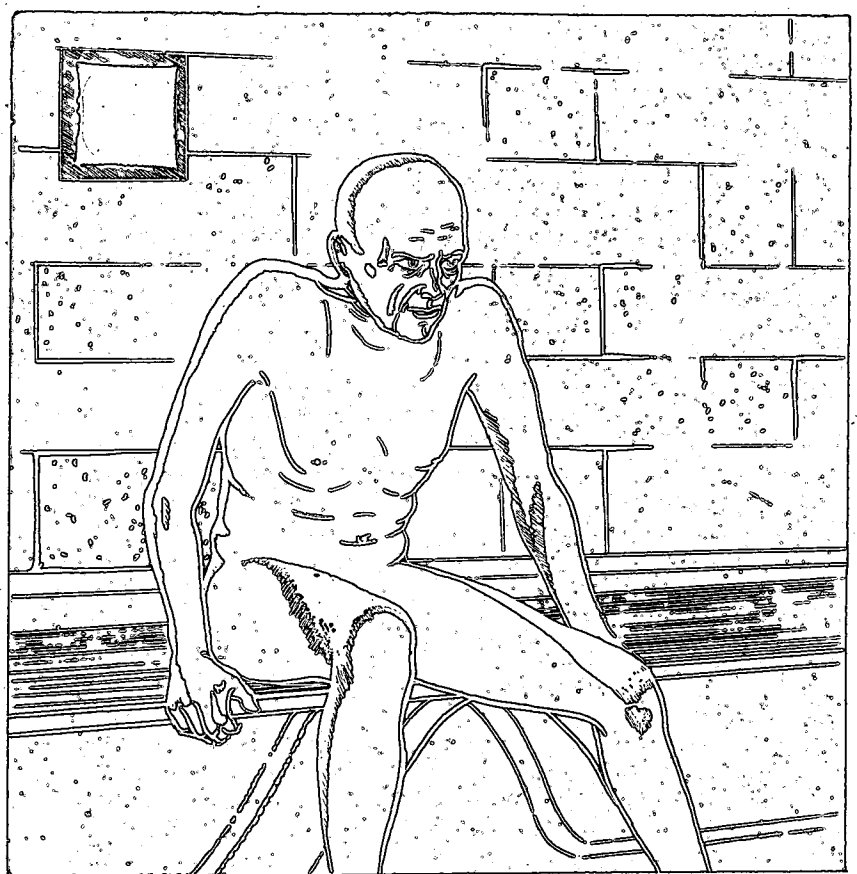

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Worm in the Woodwork

BY E. C. TUBB

It is never wise to enslave a man who is cleverer than you . . .

■ The examiner was a man of indeterminate age, his face a smooth collection of planes and curves without lines or exaggerated features. His body was slim like that of a boy but his eyes had nothing to do with youth. They were cold, impersonal, detached and, because of that, a little frightening. His name was Vertcon Ewart. He was studiously polite.

"Please be seated, Professor Ludec. The chair, I trust, is comfortable? The atmosphere to your liking?" A gesture indicated that the conditioning would be adjusted if Ludec so wished. "Is there anything you require?"

"My freedom."

"Please, professor, you jest." Ewart leaned back, his hands resting easily on the surface of the desk between them, his eyes unblinking. "I take it that you fully appreciate the nature of your situation?"

Ludec did not answer.

"You are an intelligent man. As a master of extrapotential logic you must have assessed the facts of the matter. You are, to be blunt, utterly helpless." Ewart extended a package of cigarettes. "No? You surprise me. I understood that all Earthmen smoked."

"Do you smoke?"

"I am a Kindian, not an Earthman."

"You are Homo sapiens," said Ludec mildly. "Your great-great-grandparents came from Earth." He leaned back in the chair so thoughtfully provided. "Is there any point in my saying that you are wasting your time?"

"I disagree, professor."

"That is your privilege. But I am not going to help you."

"You know?"

"You mentioned my abilities—they would be small indeed if I had not guessed why I was forcibly taken and brought here. Tell me, how close are you to outright war with Earth?"

"You are the logician."

"Very close." Ludec sighed and closed his eyes. Relaxed in the big chair he seemed very small. He was old, his hair a sparse ruff of white around his pink scalp, his face graven with lines of time, experience and

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character. His hands, as they rested on his knees, were very thin, the veins quite prominent. His eyes, when he opened them, belied his age. They were bright, keen, shining with shrewd intelligence.

"Very close," he repeated. "A ship of the Terran League wantonly attacked, the crew and passengers slaughtered, the ship gutted and burned, myself abducted—yes, you must be very close."

"The ship was attacked by unknown pirates," said the examiner calmly. "You, unfortunately, were destroyed with the rest of the passengers. A check of the bodies will prove that."

"Clever." Ludec shook his head. "But the blind cleverness of children. Do you really believe that the Terran League will accept such a transparent facade?"

"Does it matter?"

"I think it does. And I think that you know it does. Earth is tolerant of her bellicose children-worlds but even the tolerance of Earth has limits." His eyes drifted to the window. "A pity," he mused. "It seems to be a nice world. A kind world. It would be a shame if it were to be destroyed as an example to the rest of the Outworld Federation."

"Would it be a shame if Earth were to be destroyed as an example to the Terran League?"

The examiner was still polite, still a model of courtesy, but there was a little something in his voice, a shade of expression in his eyes which seemed to chill the air. He shrugged.

"We digress, I think. You have no need to philosophize about Kindy. You are here for only one thing."

"To help you?"

"Exactly."

"At the expense of Earth?" Ludec shook his head. "I think not."

"You will have no choice," said Ewart. He spoke with the quiet conviction of a man who entertains no possible shadow of doubt.

Even on film the shambles was sickening. As the projected images died and the lights brightened Carson glanced at his companions. Both looked grim. Ross broke the silence.

"They call themselves civilized," he said bitterly. "Yet they do a thing like that."

It was the reaction Carson had expected. He looked at Radford.

"Messy," he commented. "An inside job?"

"We don't know," said Carson. "On the face of it it seems impossible. The official explanation is that the ship was attacked by pirates."

"Pirates!" Ross snorted his contempt. "Is that the best they could do?"

"You don't believe it?" Carson turned to Radford. "Do you?"

Radford shrugged. "I suppose," he said dryly, "that it is just possible for a pirate to catch a ship just as it Twists Out, incapacitate it, board it, gut and rob it as we have just seen, but it's unlikely. My guess is that they had inside help." He lit a cigarette and idly watched the smoke

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drift towards the fans. "There's really no other explanation."

It was a hard thought but one which had to be faced. Ross didn't like it. To him war was a matter of ships and men and give-and-take destruction. Something to be fought according to rules with uniforms, heroes and clean victories. War, he knew, wasn't like that but he wished it were. To Carson war was a matter of diplomacy with the threat of destruction remaining simply a threat. He could easier accept the idea of a traitor. Radford had no trouble at all in accepting it. War, to Radford, was something peculiarly nasty.

"Find who is missing," he said. "That's your traitor."

"No one is missing," said Carson. "All the bodies checked out but one." He stilled the obvious question. "It was a switch. Superficially there were no survivors. In fact Professor Ludec is missing."

"Ludec!" Radford looked thoughtful. "Are you certain?"

"Yes. We had a trace on him—he didn't even know he carried it. A nonmetallic minuscule capsule imbedded in the trachea, powered by muscular action and radiating on a VHF band. It was planted when he came in for a pre-flight medical some time ago."

"So now we know what it was all about." Radford flicked ash from his cigarette. "Our friends, apparently, have decided to play it rough. Couldn't we have kept Ludec under wraps?"

"Hardly," said Ross. "Officially we are at peace with the Outworld Federation and didn't suspect outright action. Ludec was asked to speak at the Convention on Brude and Brude is a League planet. He wanted to go and we couldn't stop him—after all, he is a civilian and a free agent. Even so we took all precautions. Both crew and passengers were screened and I had a couple of my own men planted to keep an eye on him." Ross paused. "They were good men."

"Not good enough," said Radford. He didn't elaborate, he didn't have to. The men had failed, they were dead, the facts spoke for themselves. He looked at Ross.

"I take it that you have units in the area?"

"I have. Two strong forces patrolling the fringe of the Outworld Federation and a third actually in their territorial space."

"They protested, of course," said Carson, "but they had no choice. Pirates, after all, are a common enemy."

"They are probably using the presence of the League forces as good propaganda anyway," said Radford. "Good, that is, from their own point of view." He fell silent, musing, his heavy face lined with thought. Finally he crushed out his cigarette.

"The trouble with governments," he said, "is that when they turn crooked they go the whole way. The Outworld Federation has turned criminal. That makes them just that much more dangerous."

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"They were dangerous before," said Carson.

"True, but not quite in the same way. Then they followed the rules and were limited in what they could do. Now they are using outright force—thinly disguised but criminal in every sense of the word. Well, they started it, we'll finish it."

"We?"

"My boys, the Special Agents." Radford smiled at Carson. "So perhaps you think I'm conceited well, maybe I am. But when all your soft talk fails and Ross is up against something bigger than he is, what is left?"

"I won't argue."

"Don't argue, I speak the truth and you know it. Ross slipped up on his security; he won't find that traitor but you can bet your life there was one. Some money-hungry lad or a sleeper or even a misguided patriot, who knows? The only thing certain is that he did his job and then got paid off in a manner he didn't expect."

"Old history," said Ross. He wasn't annoyed at Radford's remarks, the thing was too important for that and, anyway, all three of them were old friends. "But what happens next?"

"We find Ludec," said Carson. Radford raised his eyebrows.

"Rescued?"

"He is to be found and rescued if possible."

"And if not possible?"

It sometimes seemed to Ludec as if this was one of the most pleasant times of his life. Each day he was attended by Colonel Ewart and each day they had long conversations. They took trips too, taking a flitcopter and soaring over the rolling woods and plains of Kindy. It would have been easy to dismiss the other flitcopters which never left them; easy also to overlook the fact that they never landed in populated areas.

Had Ludec been a younger man, or other than what he was, the treatment might have worked. Ewart was sympathetic, his courtesy was smooth, the attention paid to the old man was flattering. He was made to feel important, intelligent and appreciated by those around him. It was flattery but so subtle and so engaging that it was hard to admit that it was flattery at all.

But Ludec never for one moment forgot that he was a prisoner.

He was old, experienced in the ways of men and, above all, he was a master of extrapotential logic. It amused him to wait knowing that the holiday had to have an end. He could afford to wait. He was not surprised when the routine was broken.

Ewart, as usual, was at his desk. As usual he gestured Ludec to a chair, offered cigarettes, inquired about his health, his comfort, his wishes. Then, as if it were the most natural thing in the world, he passed a sheet of paper towards the old man.

"This is something which will interest you, professor. It is a simple problem in extrapotential logic. As you know Kindy exports bula pods

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to Eden and receives various items in exchange. We have a trade rival who also cultivates bula and who has managed to acquire a strangle hold on our common market. What we would like you to tell us is how best we can use our forces to restore an equitable balance of trade."

"Forces?"

"Commercial forces, naturally." Ewart gestured towards the paper. "The data is assembled there for your consideration. Would you require the use of a computing mechanism?"

"No, thank you."

"You can do it without?" Ewart's voice was loaded with admiration. "You are a clever man, professor."

"Too clever to be misguided." Ludec didn't touch the paper. His eyes remained steady on the examiner. Ewart was the first to speak.

"Misguided? Surely you are mistaken? It is only a small thing I ask."

"Small?"

"A matter of a commercial adjustment, to you, can only be small. I wonder that you hesitate."

"I do not hesitate. I refuse."

"I see." Ewart, if he felt disappointment, did not show it. "Aren't you comfortable here?"

"Very comfortable. It would be ungrateful of me to state otherwise."

"Gratitude, professor, should work both ways. You would find us very grateful if you could see your way clear to solve this little problem for us. I assure you that it has no military significance whatsoever."

Ludec didn't reply. It had been cleverly done, he admitted it, but it had failed because he had expected it. He had, he realized, been subjected to a stream of constant propaganda since the moment he first met the examiner. All the conversations, all the trips and the holiday atmosphere had been deliberately designed to soften him, to make him amenable so that now, when he was asked an undoubtedly simple and harmless request, he would have agreed from sheer gratitude if nothing else.

Then, of course, there would have been other requests, and others, and each would have been a little less harmless until they owned what they had slaughtered a shipload of men to obtain.

He felt almost sorry to disappoint them.

He wondered just what would come next.

Leaver was asleep at Twist In, working on the principle that it was best to get things while they were going. He didn't regret missing the queer, inside-out twisting which always accompanied the transition from normal flight to hi-drive even though it was a tourist Must. Leaver was no tourist, he was no businessman either no matter what his papers might say though, in a sense, that wasn't strictly true. He was a businessman in a peculiar sort of trade in which murder, violence and sudden death played no small part.

Leaver was one of Radford's boys. Sprawled on his bunk he stretched

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in the sheer pleasure of attainment. Being what he was supposed to be he traveled in style with his own cabin and first-class treatment. He grinned as the wall-speaker chimed and a beautifully modulated female voice announced:

"Dinner is now ready in the salon."

Leaver could appreciate the humor of it.

He didn't pause as he entered the salon but habit sent his eyes flickering about the compartment. Before he took his seat he had assessed the other passengers. Rich, worried, spoiled, indolent and a scatter of those who had money and saw no reason for not spending it. His table held a red-faced man who introduced himself as an agent for a drug company; a society girl who labored under the delusion that to be ignorant was to be cute, a matron riding herd on her husband and a young man who looked as if he might be a poet but who was probably the second son of some tycoon.

Leaver nodded at them, sat down, unfolded his napkin and slid easily into the groove he was supposed to occupy.

"Heading Outworld, Leaver?" Mason, the drug agent, spoke around his fork. Leaver nodded.

"Me, too." Mason gulped his mouthful. "Now don't tell me it's dangerous, I'm not interested. All I know is that with the Outworlder's getting the hogs share of the market this is no time to slack."

"Is it dangerous?" Leaver was innocent. The matron was horrified.

"Well! Surely you must have heard about the dreadful thing which happened at Bude? Piracy, in this day and age, you wouldn't think the patrol would allow it!"

"Did they?" Leaver sipped at his wine. "Allow it, I mean."

"It happened." To the matron that was enough. "If my daughter wasn't expecting a baby on Arle, nothing would have persuaded me to leave Earth. Her first, you know, a girl needs her mother at a time like that."

Leaver thought that the girl needed her mother about as much as a hole in the head but he didn't say so. He didn't pursue the conversation either and soon the matron was talking to Mason to the drug agent's obvious discomfort. Lighting a slender cigar he settled back, toying with his coffee and brandy, his eyes somnolent but his ears very much alert.

The society girl was talking to the poet and appealing to his male vanity by a thirst for knowledge. She seemed confident he could explain to her in words of one syllable just what hi-drive was and how it worked. He couldn't. No one could. When she appealed to Leaver he shrugged.

"Think of a moving strip," he suggested. "One man is walking on the sidewalk, another man is walking on a moving strip. They both walk at the same rate but because one is walking on a moving strip he is traveling faster than the other. Call the sidewalk normal space and call the moving strip hi-drive and you have it."

"But isn't there something about subjective time?" She was pretty, even

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prettier when she frowned and her eyes were lovely.

"Forget it," said Leaver. "Time passes at the same rate for the two men and the analogy holds good." He smiled at her, his lean face with the creased cheeks and the ruthless eyes very masculine against the softness of the salon. "Is there anything else you would like to know?"

"Will you be at the dance tonight?"

He was at the dance. He danced with the girl whose name was Lorna and who was no fool and who had designs on the poetlike second son of a tycoon. He danced with fat matrons and withered spinsters and women who rode the ships for reasons other than pleasure. He danced and he talked and drank a little and swapped a few stories and told a few lies. And he listened.

He never stopped listening.

Back in his cabin with the door bolted and the lights dimmed he relaxed and thought about what he had heard. It amounted to very little. Horror at the piracy, impatient bellicosity at the Outworld Federation, annoyance at the threats to business and the general opinions of those who had no real opinions. But not a word about Ludec.

He hadn't really expected anything different but it would have helped. Radford had given the orders and they had to be obeyed.

Find Ludec.

Rescue him if possible—kill him if not.

It would have helped to have known just where Ludec was.

The place was very sterile, very clean, very bright and shining with its polished metal, gleaming crystal and ceramics. It looked like the operating theater of a modern hospital, which it probably was, but Professor Ludec wasn't deluded. It was a torture chamber and he was to be the victim.

"Are you sure that you haven't reconsidered, professor?" Ewart was still the same, his voice as carefully modulated as before, his clothing snug to his body and his eyes as they had always been. If anything, his politeness made things worse.

"No." Ludec swallowed against the dryness of his throat. He gestured towards the room. "Is this necessary?"

"It could be avoided." Ewart paused, waiting for an answer. When none came he signaled towards an elderly man wearing a white coat who looked like the doctor he was.

"This is Dr. Johns," said Ewart. "He would like to examine you."

"My heart is sound," said Ludec. He ran the tip of his tongue over his lips. He looked and acted like a man in the extreme of nervous fear. He was sweating as Johns led him towards a chair, strapped him down and adjusted various electrodes. "You know," he said to Ewart, "you are a foolish man."

"Indeed?"

"You fail to recognize opportunity," said Ludec. "You are young, ambitious and intelligent in a fashion and yet your methods are barbaric. I—"

"Enough!" Ewart glanced at Johns who nodded. "Let us begin."

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Johns stepped back and threw a rheostat to the first notch.

Ludec fainted.

"Revive him," snapped Ewart. He waited until Ludec regained consciousness then nodded to Johns who again operated the switch.

Ludec fainted again.

He did it quite easily, not even straining against the straps as the current seared his nerves. It was almost as if he simply fell asleep at the first touch of pain. He did it twice more and then a third time. Johns glanced at Ewart and shrugged.

"Unusual but not unknown," he said. "I'm afraid that this method of persuasion isn't going to work."

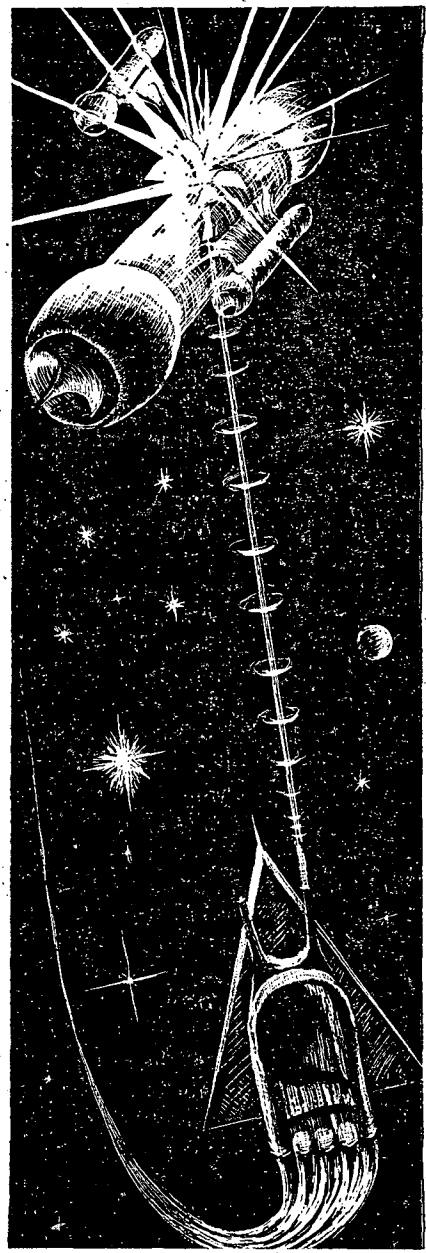
"Why not?"

"Ludec is unusual in that he has a built-in defense mechanism against pain. He simply cannot stand pain so he faints to avoid it." Johns began to unfasten the straps. "We could raise his pain level, of course, but that wouldn't do any good. It is the actual sensation of pain which causes the faint-escape not the thought or sight of it. I'm sorry, examiner."

Ewart bit his lip, it was an unforeseen complication. Ludec, he knew, was an unusual man in many ways but he had never anticipated this. Even with the evidence before his eyes he found it hard to believe.

"Could a man have such an anti-survival trait?"

"He could, and has," said Johns. "Remember that pain is a variable. I don't suppose for one moment that if he were in a fire, for example, and was slightly burned, he would faint.



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In such a case he would be in such an emotional state that he wouldn't feel the pain; his pain level would have risen beneath the threat of extinction." He finished unfastening the straps. "But that doesn't help us in this case. He was terrified when we fastened him in the chair. Pain and torment, to him, are simply unbearable."

"A weakling," sneered Ewart. Johns shook his head.

"Strength is relative," he said. "Ludec's strength lies in other directions." He looked down at the unconscious man. "Such an imagination," he mused. "The ability to take data and extrapolate it on lines of logical sequence so that he can predict the outcome even before the act. We can all do that, of course, but when we do it we only make shrewd guesses. Ludec doesn't guess, he knows, and he knows with a hundred per cent accuracy."

"If you are correct, then he knew exactly what we intended to do."

"Of course." Johns looked surprised. "Surely you assessed that in your calculations?"

"Naturally, but if he is so afraid of pain and yet knew that he would be subject to pain, then why accept the ordeal?" Ewart answered his own question. "Unless he knew that it would be a mere formality. He must know of his peculiarity." His face hardened. "I wonder if he would be as willing to accept amputation?"

"Raise his pain level and administer local anesthetics?" Johns pondered the problem as if it were only of academic interest. "The mental shock of seeing his limbs being severed from his body would undoubtedly throw him into catatonia—another form of escape mechanism. I cannot advise it, examiner."

"No, you are probably correct. In any case it would hardly be the way to gain his active co-operation." He looked sharply at the doctor. "Is something wrong?"

"I was just thinking about what he said to you," said Johns. "It struck me as rather odd. Why should he accuse you of being a man who failed to recognize opportunity?"

"I have no idea." Ewart was stiff. "It is of no importance." He glanced down at Ludec. "Revive him and proceed to the next stage. You know what to do."

Johns nodded, his eyes thoughtful as they watched Ewart leave the room. He was frowning as he stooped over the unconscious man.

Carson was playing politics. He was urbane, bland, punctiliously polite and supremely affable and his voice was like rich cream as he played with words. Inwardly he fretted at the necessity of what he was doing. It would be a relief to be able, just for once, to speak his mind, to cut through the painful protocol and the whole phony facade. Not that he would, of course; or even could for that matter. He had played politics all his life and had found the weapon of words to be potent indeed.

So he smiled and relaxed in out-

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ward ease and offered hospitality to the Ambassador of the Outworld Federation, a man Carson heartily detested.

"Some more wine, Your Excellency? A little wine does help to relax a man, I always say."

Serg Helbroft grunted but accepted more wine. Like all Outworlders he seemed to be carrying a perpetual chip on his shoulder and his position so inflated his esteem that he was insufferable. Now he sipped the wine, grunted again, and set down the glass.

"I'll not waste time, Carson," he snapped. "The fact is that the presence of armed ships of the Terran League in Outworld territorial space can no longer be tolerated. They must be withdrawn immediately!"

"But, Your Excellency, surely we discussed this matter before and you agreed, I am certain, that while the threat of piracy still existed our ships were justified in protecting spatial commerce." Carson helped them both to more wine. "The need, as I see it, still exists."

"How so?"

"As yet the pirates have not been caught." Carson raised his glass and studied the color of his wine. "I suggest that, until they have been destroyed, our ships will continue to patrol as at present."

"The Outworld Federation does not see it in quite that light."

"The Outworld Federation has suffered no loss because of these pirates!" Carson lowered his glass and stared directly at his companion. "Your demands could give rise to ugly speculations," he said deliberately. "The peoples of the League may even think that the Federaton has something to hide. A ridiculous concept, I admit, but a natural one in the circumstances."

"Very ridiculous!" Helbroft snorted his contempt and then, because he was also a diplomat, his voice became casual. "Do you believe that the pirates originated in the Federation?"

"It is possible." Carson's smile and shrug took any offense from the words. "After all, the Outworld planets are, in many cases, not as fully developed as those of the League. It is feasibly possible that a group of hot-heads may have turned pirate. It was undoubtedly an individual enterprise and, as such, indefensible."

"Of course."

"It is inconceivable that it could be anything else," continued Carson. "Piracy with its attendant murder, pillage and destruction, is not the act of a responsible government. A group, on the other hand, could have considered that they had much to gain." He sipped at his wine. "I refer, of course, to Professor Ludec."

"The master logican?"

"Yes. Unfortuntely he is dead, wantonly murdered, a tragic loss to the Terran League and to civilization as a whole. But, if by some miracle he were not dead, but in the hands of the pirates—I am talking sheer surmise, you understand—then things would be very different."

"How so?"

"Isn't it obvious? You know of the professor and his unique talent. Imag-

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ine that he is the prisoner of a small group of men and that, by some method, they persuade him to help them. Such a group would then know exactly where and how to strike for maximum effect. They could literally do as they pleased."

"Pirates?" Helbroft sneered. "I can hardly think so."

"If they were pirates," said Carson softly. He seemed very interested in his wine. "I find it interesting to speculate, as you must also, and in a way it is a necessary part of our daily life. Assume that Ludec did not die. Assume that he is the prisoner of a small group of, say, military officers. Assume that they are intelligent enough to recognize their opportunity. How long do you think it would take them to form a cabal, force a *coup d'etat* and, literally, become masters of—Well, you see what I mean."

"But Ludec is dead."

"Yes. So, if they were normal pirates, his death means nothing to them. They were simply after loot. Being what they are they will strike again—if they are genuine pirates."

"Is there any doubt?" Helbroft bridled. "Are you suggesting—"

"I suggest only that, until they are destroyed, our ships will continue to patrol as at present," said Carson blandly. "I am sure you understand."

Later, alone, he drank neat Scotch but it did little to remove the taste from his mouth.

Twist Out came and with it the peculiar outside-in twisting which some people professed to adore but which Leaver could have done without. He pushed aside his plate wondering at the mismanagement which had terminated their flight through hidrive halfway through a meal. At a table next to his own a woman screamed with a falsetto falseness.

"Goodness! Do you think we will be attacked by the pirates?"

Her companion, a man old enough to be her father but wasn't, soothed her but she had only echoed the general sentiment. Personally Leaver was sick of it. He seemed to have heard nothing but pirates, what they had done, what they could do and what they might do ever since he had left Earth. At Arle, at Cord, at Benwick and at Leam it had been the same. Now that they were actually within Outworld Federation territorial space it seemed worse.

As was the shipboard inspection.

The inspectors were, he guessed, from Hind, and they took what amounted to a sadistic delight in exerting their authority. It wasn't enough that they examined each person's papers with painstaking care. They insisted on fully proving identities, disclosures of business, reasons for travel and added insult to injury by demanding the answers to certain highly personal questions.

Waiting his turn Leaver wondered why they thought it necessary to so display their power. If he knew the answer to that, he guessed, he would know the answer as to why the Federation should be so anti-League in the first place. It probably all

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stemmed from a thwarted jealousy or an inferiority complex with attendant overcompensation; something like that. The small boy determined to show his parents that he was better than the old man or the tough orphan flexing his muscles for fear that gentleness should be mistaken for weakness.

He found it rather ridiculous.

The man ahead of him didn't find it either ridiculous or amusing. He faced the inspector, his ears burning and face mottled with anger.

"What the devil do you mean? I've traded with Hind for years now, what's the point of all this?"

"You will answer the questions," said the inspector coldly.

"I refuse! You have no right to question me on such matters."

"No?" The inspector was enjoying this. "It may have escaped your attention but we on Hind are not degenerate Earth scum like some who batten on us. We have tolerated your kind for far too long. We have allowed you to exploit us and suffered your moral turpitude with amazing generosity. That is at an end." The inspector picked up a rubber stamp and slammed it down on the passport before him. "Entry refused. Next!"

"But—" The man's face turned from red to a sickly white. He looked at his passport as if he simply couldn't believe what he saw. "But you can't do this! My business! I—"

"Next!" The inspector ignored him. Leaver stepped forward, pushing against the reject.

"You heard what the inspector said," he snapped. "Be on your way." He laid his papers on the desk, waited as the official scanned them, and then answered the inevitable questions.

His business, he explained, was that of traveling agent. His firm were worried about the apparent breaking down of friendly relations between the League and the Federation and he was making a trip to ease the situation where and how he could. It might well be, depending on his report, that the entire firm would switch from Earth to one of the Outworld planets. The regulations on trade back in the League were hamstringing expansion and the growing habit of minor officials demanding bribes was something no reputable firm could tolerate.

There was more, much more, all pitched in the same vein. Leaver didn't make the mistake of actually decrying the League, but he certainly didn't go out of his way to offend the Federation either. It was common psychology, the con man's stock-in-trade. The inspector reached for his rubber stamp.

"You are visiting Hind, of course?"

"Naturally."

"And after?"

Leaver hesitated, then gave a grin. "Well now, that depends. I'd like to cover as much territory as possible and I'd rather not be tied to a strict routine. It may be that I'll be finished here sooner than I think or, again, it may take longer than I estimate. Frankly, my movements depend on the next available ship."

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"I see." The inspector pondered a moment then made up his mind. "I'll give you both entry and an open visa." The thud of the stamps echoed his words. "If you hurry, you will catch the first ferry."

The ferry, like all ferries, followed a strict operational procedure. Falling from the interstellar vessel it orbited the planet below, swinging closer and closer as it drove down through the atmosphere. Sitting slumped in his seat Leaver appeared to be half asleep, his eyes vacant and his body listless, the typical picture of a man who had no great love of space travel and ferry transport in particular.

But Leaver wasn't half-asleep and he certainly wasn't listless. He was concentrating as the ferry circled the world below, his whole attention focused on the need to distinguish a particular sound via the tiny receiver imbedded in his mastoid.

The sound which a certain minuscule radio capsule powered by muscular contraction and radiating on a VHF band would emit on direct line-of-sight.

Ludec's own, individual recognition signal.

The cell was a bare box ten feet on a side. It held a single light-glow plate, toilet facilities and a bare mattress. Water came through one faucet, semiliquid food through another. There was no window and no apparent door. The walls, floor and ceiling were perforated with millions of tiny holes which effectively killed all sound-reflection so that shouting became an uncomfortable thing to do.

Ludec did not shout. He sat crossed-legged on the mattress, his eyes distant with thought. He was nude and something had been injected into him which had caused the complete loss of all his hair. The same substance had, apparently, stunned the follicules so that he remained totally hairless.

He was waiting.

He had no means of marking the passage of time and had no idea how long it had been since his capture. He could guess, but he could not be certain. It was something he refused to let worry him.

There was a sigh behind him, a whisper of motion and a slight difference in the temperature of his naked back. He turned. Ewart stood against the wall. He did not speak and for a long while the two men stared at each other. Then the examiner sighed and stepped forward.

"We meet again, professor."

Ludec did not reply.

"You are a fortunate man," continued Ewart. "Or perhaps an unfortunate man, it rather depends on the point of view. To suffer a little or to suffer a lot, which do you regard as the more favorable?"

"A stupid question," said Ludec. "Do you really expect an intelligent answer?"

"I had hoped that by now you would have evaluated your true position and reached the logical conclusion." Ewart leaned his shoulders

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against the wall facing Ludec. "Is there something masochistic in your nature that you appreciate and even enjoy this experience?"

"Solitude has never bothered me." Ludec smiled. "If a man cannot tolerate his own company, then he is a poor man indeed. Is there anything else you want to know?"

"The answers to certain problems."

"I will help you if I am allowed."

"You will?" Ewart straightened his eyes, for the first time, showing emotion. "Now you are displaying true intelligence, professor. You will never regret this, I promise you."

"Wait!" Ludec held up his hand. "I think you have misunderstood what I said. I *will not* help the Federation against the League."

"But—"

"I *will* help you if I am allowed," repeated Ludec deliberately. "Or are you a man who needs no help at all?"

"What possible help could you give me? Personal help, that is?"

"That is for you to say," Ludec was bland. "You obviously consider me of great importance—why else capture me? It follows then that I must have something you desperately need. You, obviously, have been selected to obtain that something. I am not too conversant with your culture but I should imagine that it is not one which graciously accepts failure."

"I have not failed."

"No?" Ludec shrugged. "You should remember that it is dangerous to give a logician data on which to base an extrapolation. I do not envy you, my friend."

"And I," snapped Ewart, "do not envy you." He hesitated. "Why do you say I have failed?"

"I am important to the League and I am important to the Federation. If you had simply wanted to rob the League of my services, then you quite simply could have killed me but you did not do that. Therefore, you want my active assistance in your proposed war against the League. I shall not give it."

"You underestimate us, professor."

"No," said Ludec. He looked thoughtful. "No, I do not underestimate you."

It was, though Ewart couldn't know it, almost an admission of fear.

The image of the screen flickered a little despite the banks of relays and rectifiers which fought to keep the beamed signal in correct focus and density. The flicker made Ross seem older than he was or perhaps it was Carson's own imagination. Radford, at his side, puffed at a cigarette.

"They got the pirate," said Ross. "Congratulations!"

"Where?"

"Near Kindy, I'm out there now. The locals don't like it, but there's nothing they can do at the moment. They certainly didn't waste any time."

"I didn't think they would," said Carson. "What happened?"

"A farce." Ross sounded disgusted. "The way it was told to me was the way it will be told to the news agencies. A Kindian ship Twisted Ou near the second planet of their sys-

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tem. The pirate, obviously mistaking the vessel for a decadent unit of the Terran League, attacked without warning. The Kindian ship promptly returned their fire and turned the raider into incandescent ash. As the threat of piracy has now been totally removed by the efforts of the Outworld Federation, there is now no longer the slightest possible excuse for armed ships of the Terran League to continue to patrol Outworld territorial space et cetera, et cetera. You know the kind of thing."

"I invented it," said Carson. He rubbed his chin. "Incandescent ash, eh? Just how did they manage to do that?"

"A direct hit with an atomic torpedo."

"And so no wreckage, no survivors, no awkward questions. In short a nice, neat whitewash job—or so they think."

"It's raw," admitted Ross, "but what can we do? I've tried to make investigations but if I go too far some fool will step out of line and then we'll have an incident on our hands." His flickering image became wolfish. "Not that I'd object to a showdown right now. I've had enough of these Outworlders. Give the word and I'll move in."

"You know better than that, Ross. No matter how tempting it might be to smack baby, you can't do it. Not while baby has such big teeth." He sighed. "All you can do is to pick up your marbles and come back home. You know what to do, but waste no time. It's better to leave the party early than wait to be kicked out."

"Right," said Ross. "But I don't have to like it."

The image flickered, died, pulsed and faded. Radford sent a smoke ring coiling against its surface.

"I often wonder," he mused, "what it must have been like in the old days. A gang of colonials began to flex their muscles so you sent in a couple of gunboats and made them eat crow. Easy, simple, cut-and-dried be-good-or-be-beaten politics. You could hurt them and they couldn't hurt you." He sighed. "Life must have been easy then."

"If you had the strength," said Carson. "Then people got all moralistic and fell over backwards trying to compromise. That was the height of diplomacy; the art of setting a couple of big ones against each other with you as the supposed excuse for the row between them."

Radford grunted. "Old history and it doesn't help us now. Ross can't crack the whip, because, if he does, they will dump a few loads of radioactives on League planets. We'll dump a few back, of course, but since when has mutual suicide been a solution? For the first time in the history of man the weaker is the stronger—they have less to lose."

Carson nodded. "It's a mess."

"It's a time when the individual comes back into his own," said Radford. He lit a fresh cigarette. "Well, we know one thing, the origin of the pirates. You certainly managed to smoke them out."

"Primitive emotion works with

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primitive logic." Carson shrugged. "They found that their pretense had backfired into an embarrassment. To end it they 'found' and 'destroyed' the 'pirates'. The only ones who could do that, of course, were the originators of the 'pirates' themselves. So now we know where Ludec is likely to be. Will your boys catch on?"

Radford nodded. "Relax," he said. "Ludec is as good as rescued or dead."

Ludec was neither. Looking at the map Leaver frowned, reached for a cigarette, remembered and reluctantly gave up the idea of smoking. On Kindy only decadent Earthmen smoked and he had no wish to be recognized as such. Hawken, the agent, rested his finger on the map and pursed his lips.

"Are you sure?"

"The signal came from the area." Leaver was positive. Hawken didn't argue.

"There's only one building in that area," he said. "The Institute of Medical Research."

"Tell me about it."

"It's a small place where they experiment on the mental and physical effect of bula. A couple of doctors, a lot of animals, some helpers and a few guards. Seems an odd place to hide Ludec."

"Not odd at all." Leaver leaned back, his eyes thoughtful. "They're playing with fire, and they know it. In one of the cities there is always the chance of a leak; too many people would know too much. Out there they are isolated and safe." He shrugge

"So they think, anyway. Maybe thes yokels are due for a surprise."

Hawken wasn't offended, he wasn a yokel even though he looked th part. The firm which Leaver repr sented was a genuine firm with ge uine agents and a genuine trade. If was odd in the fact that it never lo money and its higher employees live at a fantastic level of income, no or seemed to notice. The firm employe the best, paid the highest and was perfect cover for Terran espionag

Bribery was a power the Terra League never underestimated an successfully used. Perhaps because had the wealth to make that pow really work.

"What will you need?" said Hav ken. Since Leaver had introduce himself the agent had automatical taken his orders. His main job was t provide help, information and cove the Special Agent would take care the rest.

"Some sleep," said Leaver. "Son food. Detailed maps of the area and breakdown on the military setup he with key-personnel—you know th sort of thing."

Hawken looked surprised. Leav grinned.

"Look," he said. "I've been bu looking for a needle in a haysta and I mean that quite literally. If th hadn't tipped their hand, I'd still l looking, and, if you think chasing over space, ferrying down to eve planet, listening nonstop and catc ing every ship on the move is fu you should try it sometime. I'm tir

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and need to stock up on some decent cooking."

"Listening?"

"To gossip," said Leaver. He was more tired than he thought to have made such a slip. Special Agents equipment was secret and they wanted it to stay that way. He yawned. "Well, where's the bed?"

He slept, woke and ate and then settled down to study. Kindy, as he expected, had a spartan culture in that everything was supposedly for the good of the state. It was a common culture to be found on Outworld planets. Life hadn't been easy to start with and, though progress had been rapid, some of the old necessities still lingered. The existence of a strong military junta helped to keep the populace in line.

It was a dangerous setup. Any military culture must be dedicated to the concept of conquest and the Terran League offered a tempting target, Kindy was the main agitator, but the rest of the Federation pushed close behind. It was, thought Leaver, like a pot on the simmer and about ready to boil. The trouble was that a lot of innocent people were going to get burned if that happened.

It was his job to see that it didn't happen.

At first the darkness had troubled Ludec. The total absence of all light accentuated the silence so that he seemed to actually hear the pounding of his heart. Irrationally he had feared for his sight and had lain, eyes

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strained, hoping to catch some glimmer which would reassure him. He saw nothing but flashing retinal images and, after a while, logic and sanity came to his rescue. He accepted the darkness for what it was.

They had tried persuasion. They had tried pain and then intimidation. Now they were trying darkness.

It was effective, he had to admit that, or would have been with another man. He smiled to himself at the conceit of the thought then lost the smile in deeper consideration. He was an oxygen-breather, a man, and basically, all men are the same. How could he be certain that he would remain immune?

The technique wasn't new, but it had been applied with a subtlety which made it all the more effective. They had removed all his hair and stunned the follicules in some way so that he remained completely bald. Hair has long been a man's pride—remove it and you take away that pride, the very stamp of masculinity.

Take away all clothing. A nude man is a helpless thing conditioned as he is by civilization. From the very day of birth covering of one sort or another is a part of normal life. Nudity spells defenselessness.

Put him in a small room, totally soundproofed and equipped with the bare essentials of life.

Leave him.

That was the subtlest torment of all. Man is a gregarious animal, he craves the company of his own kind. He likes to talk, to feel a part of a whole, to know that others are always around. A man, naked, isolated in a small, dark, soundproof room is a man cut off from the world, from life itself. For an intelligent man it is worse for then he is reduced to the level of an animal and has the intelligence to realize it.

Ludec sighed, knowing that there would be other things, that the torment would not remain static. The oxygen content of the air would be lowered. The food, already a tasteless pulp, would be reduced. The water would become scarce. Dirt would accumulate. The temperature would fall—

He shuddered, his own logic completing the pattern. He would be ground down, down, down and then, so gently, so insidiously, would come the conditioning. Whisper-speakers would talk directly to his subconscious while he rested in exhausted slumber. His brain, dull and receptive, would eagerly accept the insidious suggestions, the warped logic. Without drugs, without physical pain, without any specious arguments he would come to accept what was offered. He would accept it and believe it without dispute.

And there was no escape. It was in fact as escape-proof as a perfect logical syllogism.

There was nothing but time, for such conditioning took time. No hope but Earth for only Earth could save him. And, if they did not save him, then he would help destroy them. There was nothing else he could do.

He could not destroy himself.

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The general was tall, slim, hard of face and eye. Superficially he looked a little as Ewart might have looked were he older and dressed in black and silver heavy with braid. He stared at the examiner then at Dr. Johns standing deferentially to the rear.

"How much longer must I wait until this man agrees to co-operate?"

"These things take time," said Ewart. "There have been unforeseen complications."

"His inability to endure pain?" The general nodded. "I have read the reports. Why couldn't he be conditioned in some other way?"

"He is." Ewart nodded to Johns who snapped a switch. An infrared receiving screen glowed to a ghostly life. Ludec, sitting huddled in a corner of his cell, came into view.

"So?" The general was impatient. Johns hastened to explain.

"We are working under peculiar difficulties. We require more than agreement, we require active co-operation. To obtain it we must first persuade Ludec that our cause is both just and logical."

"Can there be any doubt as to that?"

"Apparently there is. To Ludec, that is," explained Johns hastily, "he refuses to admit either the justice or the logic of our struggle against the League."

"He must be made to change his attitude."

"That is the entire purpose of this conditioning. We are breaking him down to almost the animalistic level. At that point he will be susceptible to suggestion. Unfortunately it takes time."

The general nodded, his eyes on the screen. Ludec hadn't changed position and the general stared at him as he would look at a piece of wood.

"It is difficult to believe," he said, "that such an insignificant looking creature could have such importance." He glanced at Ewart and then at Johns. "It is also difficult to believe that you should have nothing to report but failure. It is not what I had expected."

"Failure?" Ewart stared at his superior. "Am I to take it that you consider I have failed?"

"That is the usual converse to success," said the general coldly. "And you can hardly claim to have succeeded." He glanced at the screen again then irritably snapped his fingers. Johns hastened to switch it off. "I think he should be removed to a different place."

"No!"

"Indeed?" The general stared coldly at the examiner. Ewart swallowed.

"To remove him now, to even have contact with him, would be to undo all that we have done. The effects of this treatment are accumulative. With all due respect, general, I must advise that he stay here until the conditioning is complete."

"Your advice is noted—and rejected."

"I am sorry." Ewart remained calm. "If you insist on ignoring my advice, then I have no alternative but

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to refer the matter to the High Council."

"You would dare!" The general stared at Ewart waiting for the examiner's eyes to fall. They did not fall. Slowly the general nodded.

"I see we understand each other, examiner. You will hear more on this matter."

When he had gone Johns looked thoughtfully at the other man.

I wonder just how long it will be before you are arrested, replaced and tried for treason."

"Are you joking?"

"No, just being logical." Johns switched on the screen. "I haven't said much before, but I've been thinking a lot. I've been wondering just how you condition a man who is probably fully aware of just what you are trying to do."

"Ludec?" Ewart joined Johns before the screen. "If I remember, you said something of a similar nature before."

"It still applies. Ludec is a genius, there is no other word to describe him. I refuse to believe that he didn't anticipate everything that has happened to him since the moment of his capture."

"I doubt it. If so, he would have recognized his position and agreed to help us. Logically he can do nothing else."

"Exactly—and that is why I am worried. Ludec is a man who has always lived by his logic, why then should he change now? I don't think that he has changed." Johns stared thoughtfully at the screen. "It was rather odd that he promised to help you, don't you think?"

"His offer was a trap. He obviously hoped to weaken my allegiance to the Federation."

"You think so? I didn't take it like that. It was, after all, a personal offer of assistance should you allow it. Strange that, at this moment, you could use such assistance."

"I—" Ewart broke off, considering. The conversation, naturally, had been recorded and Johns had heard the recording. The tape had been sent to Headquarters and others had obviously heard it, too. He had just made an enemy of the general and it took only elementary logic to deduce that the two added together would spell trouble.

On Kindy military trouble was usually solved by a firing squad.

Through the infrared scanner the building looked ghostly and deserted. Leaver took the instrument from his eyes, blinked in the total darkness and adjusted the scanner again. A voice, tiny and remote, whispered in his ear.

"How much longer?"

Changa was impatient and a little resentful that Leaver had arrived first. He and Hoolin, two more of Radford's boys, had arrived on Kindy two days after Leaver and felt bad about it. Most of their disappointment had vanished in the past week of intense activity.

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"Take it easy." Leaver settled himself more easily on the ground. It was dark, a cold wind was blowing and he wasn't really dressed for nocturnal activity. A second voice, that of Hoolin, echoed in his brain.

"I've contacted Ross. He will be arriving on schedule. Need any help?"

"No. How are things in the city?"

"Bad." Hoolin chuckled. "With six of the top-brass dead from various causes everyone has the jumps. Are you sure you can handle it without me?"

"I'm sure. Sign off now, you're disturbing my concentration."

Leaver was getting worried. His plan had been simple and, like all simple plans, should work. With information supplied by the agent he had selected six leaders of the military junta as his victims. They all occupied key positions and, if they hadn't been actively engaged in the kidnaping of Ludec, then they should have been aware of it. Those six men had been assassinated.

It wasn't simply punishment though they deserved it for breaking the peace. It wasn't even to set an example, though, if it did, it would be all to the good. It was basically to create a situation of uncertainty and terror. When men die others get worried that they may also die. When the dead men leave a power-vacuum then there is always strife to fill it. Sooner or later someone in the know would remember that they had the answers to all their questions locked away in the isolated building. It was only a matter of waiting until they arrived.

Leaver had been waiting two nights and a day now.

A cold wind whipped under his collar and he shivered. His eyes burned and, despite the drugs he had taken fatigue began to master him. His lids drooped and he sighed. He snapped immediately fully awake as a voice whispered in his ear.

"Leaver!"

It was Changa. Even over the built-in radio his voice sounded excited. Leaver flexed the muscles of his throat in silent conversation.

"Where?"

"To your right. A drifting flitcopter without lights. Got it?"

"Got it."

Leaver swung up the scanner and stared at the lightless, almost soundless craft as it came drifting down. It bumped down between him and the building, landing by radar. The cabin door opened and a man descended. He was a tall man, slim like all Kindians, covered from neck to heel in a long, black, military cloak. Two other men stepped down beside him, aides, Leaver guessed. The pilot, obviously, remained within the craft.

"Leaver?"

"I'm on my way." Leaver rose to his feet. He, like the tall man, wore a long military cloak and, beneath it, he was dressed as a high ranking officer of the Kindian junta. Clamping the scanner to his eyes he began to run towards the building.

Changa sighed and settled his cheek against the stock of his auto-

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matic rifle. It was a beautiful weapon, fitted with a universal compensating sight and loaded with silent, flashless ammunition. He waited until the distant figure of Leaver had reached the agreed position and then gently squeezed the trigger.

The men who had landed with the tall officer didn't know what had hit them. The pilot, relaxing in his chair, died as lead sliced through the thin skin of the flitcopter. The tall officer, striding arrogantly towards the building, didn't even guess anything was wrong until Leaver pressed a pistol against his kidneys.

"Relax," he said. "Just act normally and everything will be all right." Over the miniature radio which was man-made telepathy he spoke to Changa.

"I'm going in now. Wish me luck."

"You have the luck," said the unseen agent. Leaver grinned, then prodded his captive forward.

The captive was General Whylan, and, though he was a brave man, suicide didn't fit within his concept of bravery. He thumbed the signal button in the entry-code pattern, waited until the thick doors slid open and stepped inside. Leaver, pistol at the ready, followed him. Behind them the door hissed shut.

"General!" Johns stepped forward, then halted as he saw the other man. "I understood you were to arrive alone."

"He is alone." Leaver thrust the general forward so that he could cover the two of them with his gun. "Take me to Ludec."

"Ludec?" Johns looked surprised. "What are you talking about? Who are you?"

For answer Leaver swung back his cloak. Johns paled as he recognized the uniform beneath.

"You are both under arrest," snapped Leaver coldly. "The charge is treason against the Federation. I warn you that I shall shoot without hesitation if you attempt to resist. Now, take me to Ludec."

"No!"

Whylan clawed at his waist in a desperate effort to draw his pistol. Leaver turned his wrist, fired and centered the gun on Johns. He didn't look at Whylan, not even when the general slumped to the floor.

"He is dead," he told the doctor coldly. "Do you also wish to die?"

"Please!" Johns cringed at the threat of the weapon. "I'm not a traitor. Whylan contacted me and, as my superior officer, I had to obey his orders. He demanded that I release Ludec in his custody. I had no choice but to obey."

"Are you in command here?"

"No. Examiner Ewart is in command but he can't be trusted. He intends to use Ludec for his own ends. They have come to an agreement. That is why I—" He broke off, one hand lifting to his mouth.

"Yes?" said Leaver quietly. "You were saying?"

"Nothing."

"Perhaps I could help you." Leaver

« *Continued on page 169* »

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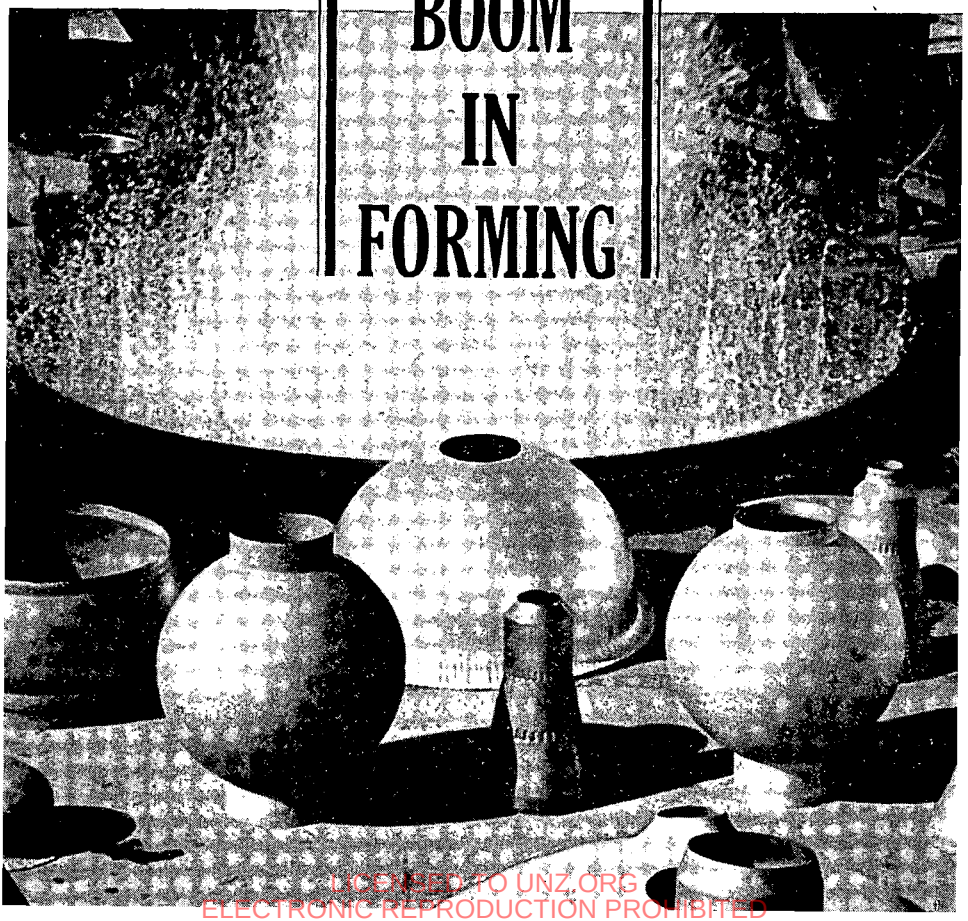
BY WILLIS CAIN . . . and by "boom" Cain isn't kidding!

They used to use explosives for tearing things apart. Now they use them to put them together.

THE BIG BOOM IN FORMING



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■ It's always fun to speculate on science's historical near-misses. Like Leonardo's flying machines, or that unsung color photography method of the 1800s. Ideas which sometimes don't catch on until centuries later, whereupon everybody says, "Why didn't they think of it sooner?"

The subject of our article could have been one of these near-misses.

In many of our great industrial plants, in spaces only recently vacant, in odd corners of loft and yard, groups of white-coated men with new and different-looking machines are—perhaps belatedly—setting up shop. Curious passers-by are occasionally startled by such effects as bangs, booms, whoooshes and thunderclaps, complete with lightning flash.

Strange goings-on perhaps, but it's not as spooky as it all might sound. The white-coated gentlemen are neither reincarnated alchemists nor mad-scientists-bent-upon-destruction; on the contrary, their motivations are consummately constructive. (But come to think of it, what they're doing is—by accepted metal working standards—not far short of Magic, at that!)

With High Energy Forming (HEF) methods now available, this new breed of engineering specialist is currently rewriting the book on Forming. Metals? You name 'em, they form 'em: tungsten, tantalum, beryllium, titanium—all the hard-to-work "problem" metals, not to mention the newer high-strength, high-temperature and refractory alloys. As a matter of fact, any metal with any degree of elongation, as well as metal powders, plastics and ceramics are now being easily formed.

Man, with his cantankerous urge to shape things nearer his heart's desire, has for centuries now, been busily torturing recalcitrant metals into more or less desired shapes—by melting, hammering, bending, stretching and otherwise belaboring 'em. Doing it the hard way, definitely.

The great strides in metalworking which took place during the industrial revolution were due in a large part to an increased ability to harness and work with higher levels of energy. Indeed, we've come a long way from the days when swords were hand-beaten into plowshares—and vice versa—to the conventional forgings, castings, presses, and drop hammers we employ today. And one of

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The next five photos show some of the steps involved in explosive sheet metal forming at General Dynamics Astronautics, San Diego. Supervisor Art Wright (back to camera) helps secure the workpiece to the top of the die.

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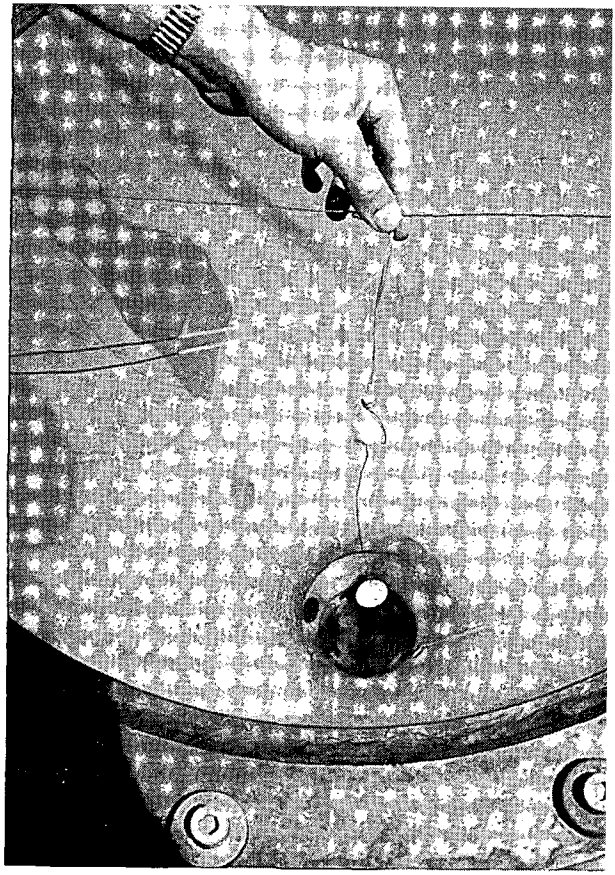

Handling half-ounce of dynamite suspended on end of wire, engineer at General Dynamics/ Astronautics places the explosive in precise position in die at explosive-forming facility recently established at plant. The dynamite explosion will "bulge" or push metal plate over die into an exact shape for use as a missile part. The entire shock waves travel through the water to compress or "push down" metal to be formed for other parts.

the reasons why we enjoy the durability, reliability and tolerances they provide has been our ability to apply increasingly higher levels of energy to the workpiece.

But no amount of forming energy handled so far, has approached the tremendous forces released by the new HEF techniques—forces in the order of millions of pounds per square inch.

High pressures alone are not the complete story, however. We've known for some time what they do to materials inside the earth and have seen them duplicated in a modest way in the production of synthetic diamonds. But we seem to have had a tendency to overlook a most interesting and important factor—the amount of *time* required to form.

Modern HEF methods utilize the high energy obtained from (1) explosives, (2) high physical impact

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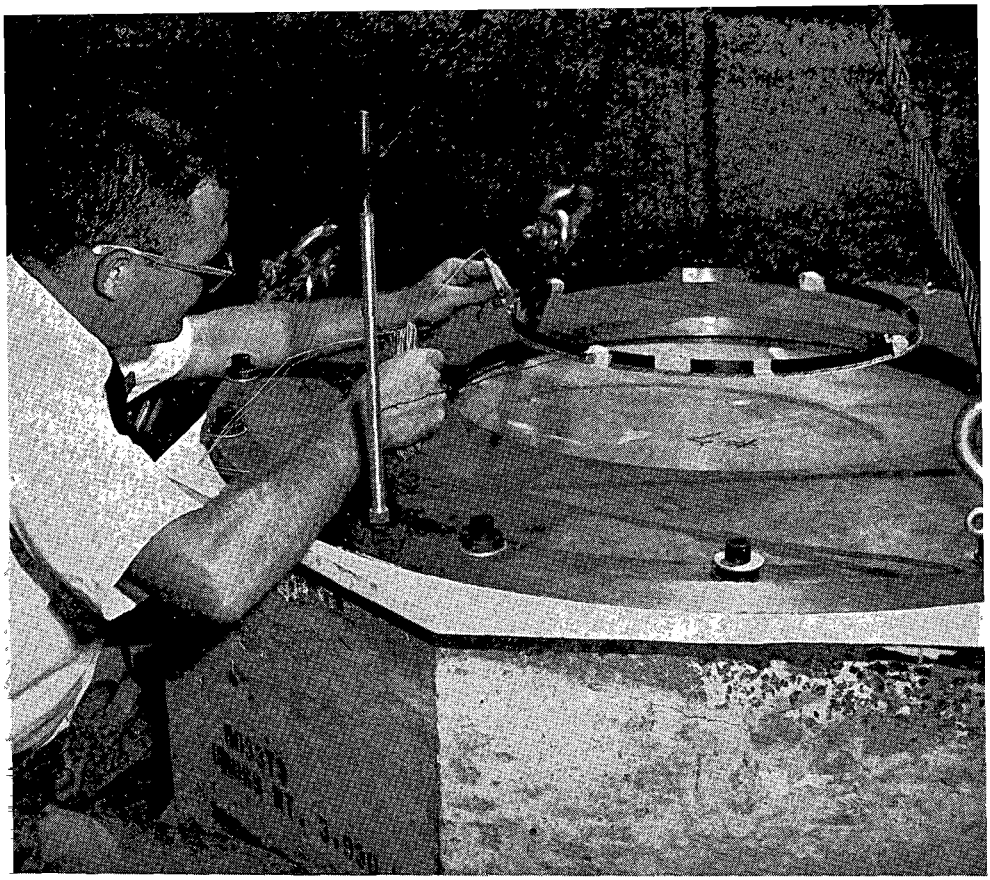

Next, Engineer Bill Wilson connects wires from the detonator.

from expanding gases and (3) the direct conversion of electrical energy to its mechanical equivalent by means of high voltage capacitor discharge. With all of these methods the actual forming is accomplished in a matter of split seconds—in the proverbial "twinkling of an eye."

What this business of extremely high forces applied in fractions of a second actually does to the stuff being formed is still being kicked around. When metals are subjected to displacement rates of one hundred to four hundred feet-per-second, or about one hundred times the velocities attained with conventional drawing and forming, you'd think "something's got to give." But it has been known for some time that metals can withstand *momentary* stresses and elongations which would cause fail-

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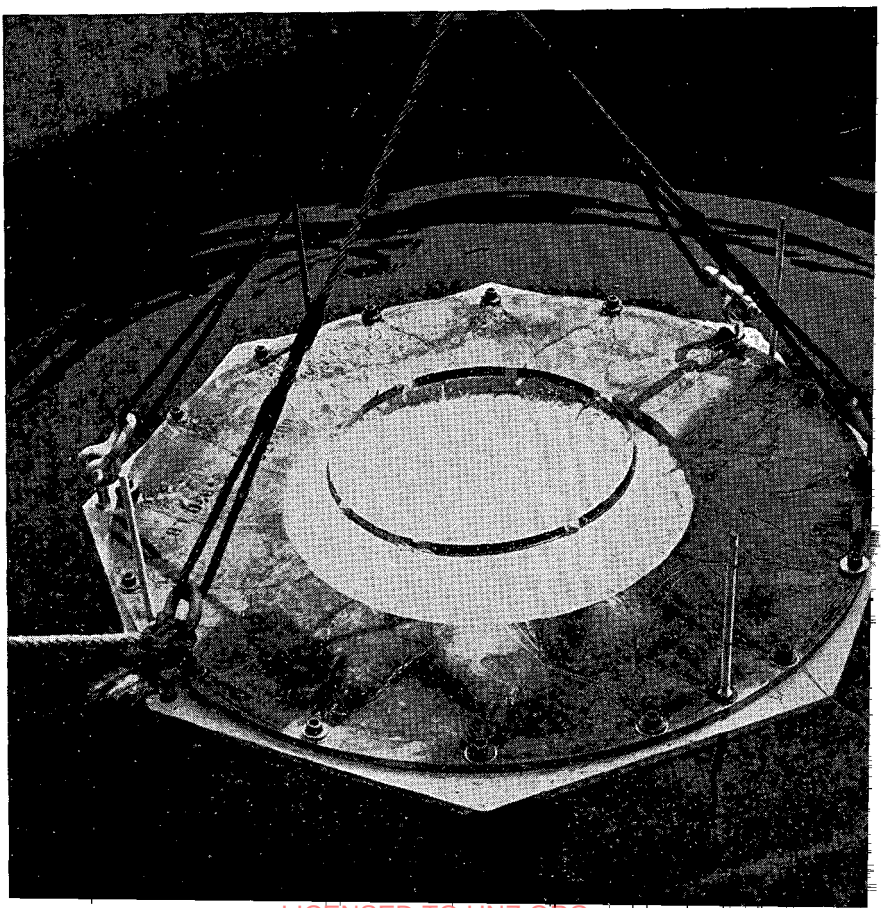
ure by ordinary methods. Just why they should behave differently under ultra-high, rapid stress loading than under the gradual stress application of conventional forming is still a good question. It is a fact, however, that HEF somehow enhances the metallurgical properties; hardness is increased, grain flow patterns are formed such as to improve the part structurally, and the metal's entire component crystalline structure is more uniformly distributed.

That these new techniques are economical there is little doubt. For one thing, scrap loss is negligible, and in most cases, annealing between forging operations is eliminated. Die costs vary. Materials include steels, Kirksite and concrete-epoxy formulations. Some applications have had troubles keeping the awesome forces involved from breaking heavy metal dies; others require only light, plastic dies. Still others use no die at all! Add to all this the low cost of capital

Lower away! Workpiece, charge and die are lowered into the tank.



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equipment—those shiny new machines are simpler than they look—and you have a convincing argument.

If HEF is so all-fired good, and the basic principle so simple, why haven't we had it sooner? Well, as opined at the start of this article, we *could* have. Sources of high energy have been available, of course, for all sorts of purposes, just waiting to be tapped; and we've tapped 'em, from water-power to atomic power—but not for forming.

Let's see, though; the Chinese had rockets—solid-fuel-type, of course—as far back as 1230 AD. No slouches as Great Wall builders, they also had quite an arsenal of mean-looking metal weapons; pikes, swords, knives, et cetera.

Wonder what would have happened if some arm-weary but inventive Chinese weapon-maker had decided to have a go at explosive forming. . . . Of course, even if he had succeeded in achieving the proper

The charge is exploded.

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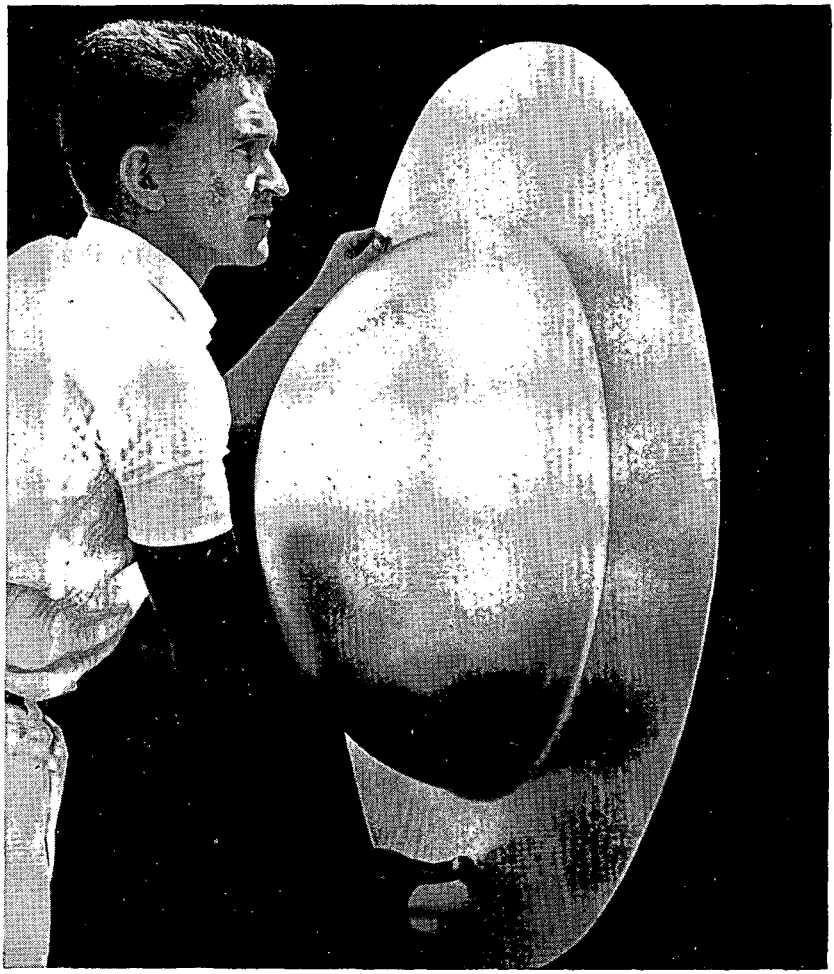

Flying saucer model? Nope, the finished part.
(Acually a test run forming of a helium bottle shroud.
The perfected part has a considerably deeper draw.)

BOOM!—and another part is explosively formed.
In the foreground are some of the shapes being fabricated by
the Ryan Aeonautical Company's facility at San Diego.
In the background are some of the dies used.

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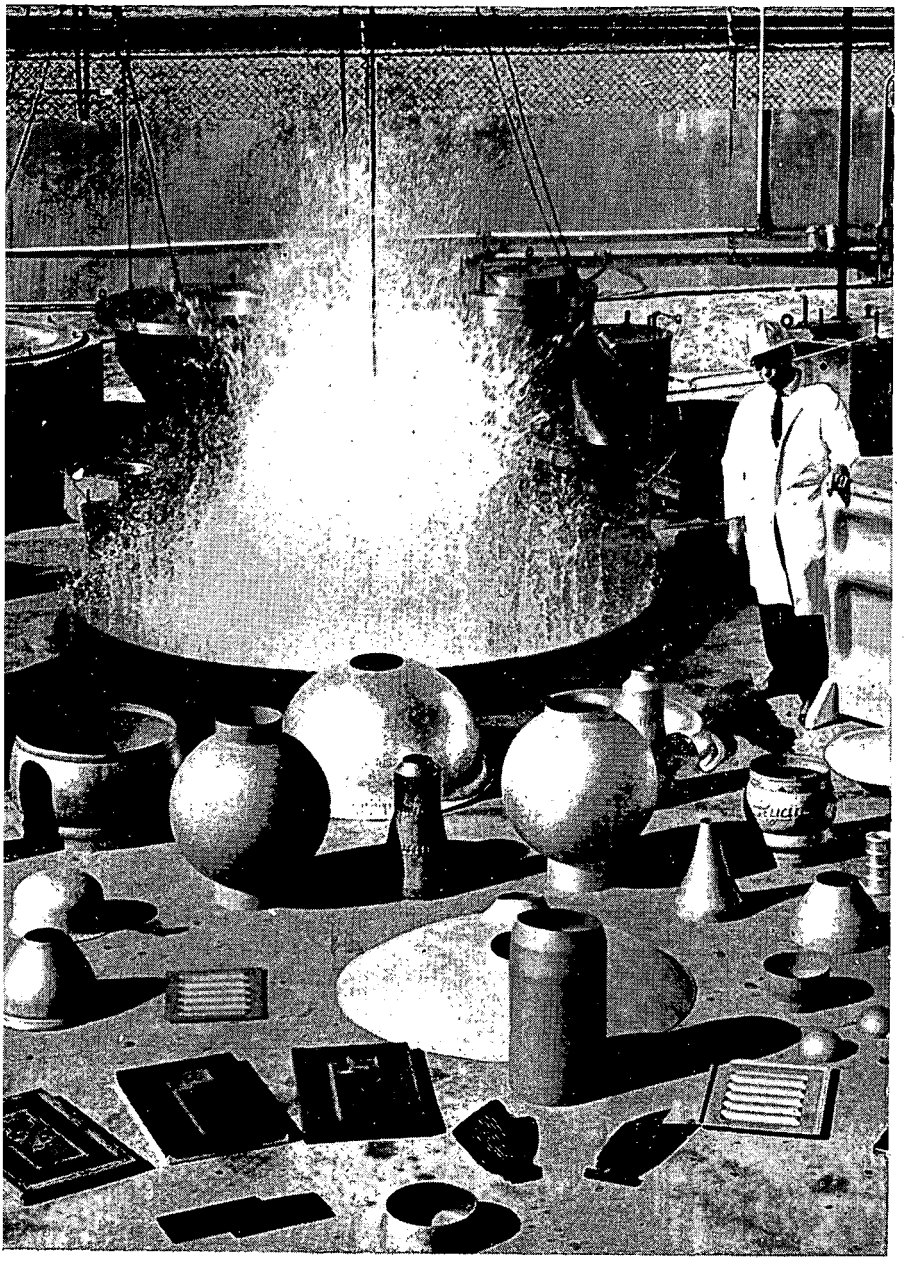

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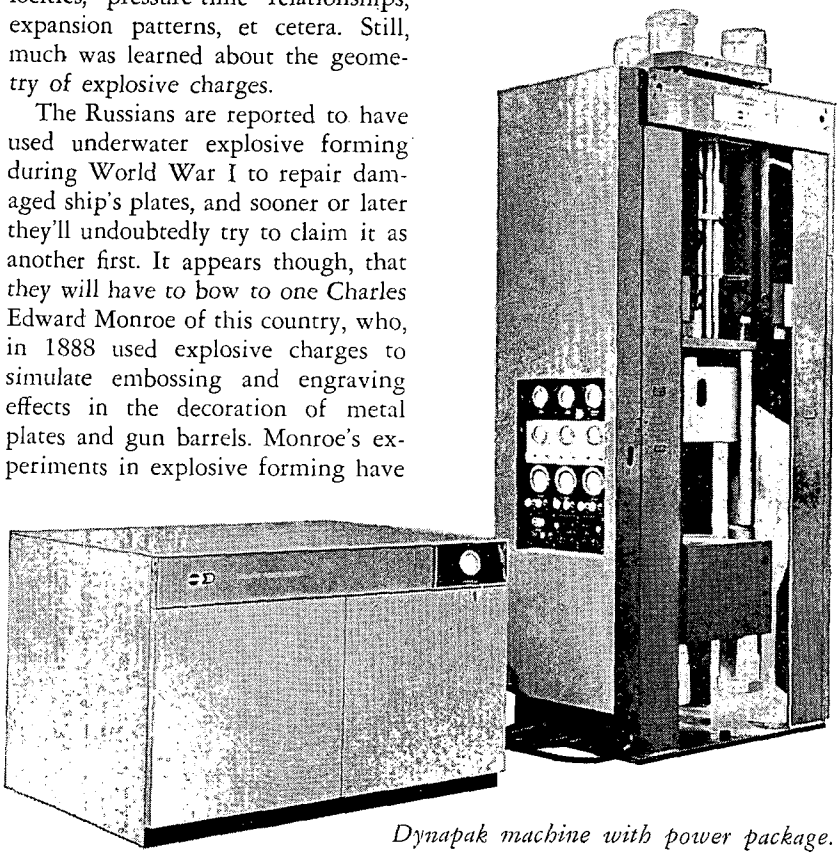
chemical mixture, he might have blown himself up in the attempt. But he also might have survived to produce a better battle-ax.

Descriptions of land mines appear in early military writings as far back as 1403, and were apparently ready for use in the Siege of Pisa in that year, but somehow never got in the act. With the advent of gunpowder, people were generally too busy shooting at each other to pay much attention to such details as detonation velocities, pressure-time relationships, expansion patterns, et cetera. Still, much was learned about the geometry of explosive charges.

The Russians are reported to have used underwater explosive forming during World War I to repair damaged ship's plates, and sooner or later they'll undoubtedly try to claim it as another first. It appears though, that they will have to bow to one Charles Edward Monroe of this country, who, in 1888 used explosive charges to simulate embossing and engraving effects in the decoration of metal plates and gun barrels. Monroe's experiments in explosive forming have netted him some small claim to immortality. Early references to the subject called it the Monroe, or Shaped-Charge Effect. It remained for a Walter Claude Johnson, an Englishman, however, to receive the first explosive metal forming patent in 1897. These gentlemen seemed to have fired the imagination of other experimenters at about the turn of the century. A vast library of material regarding various HEF processes has accumulated since then, but it has generally



Dynapak machine with power package.

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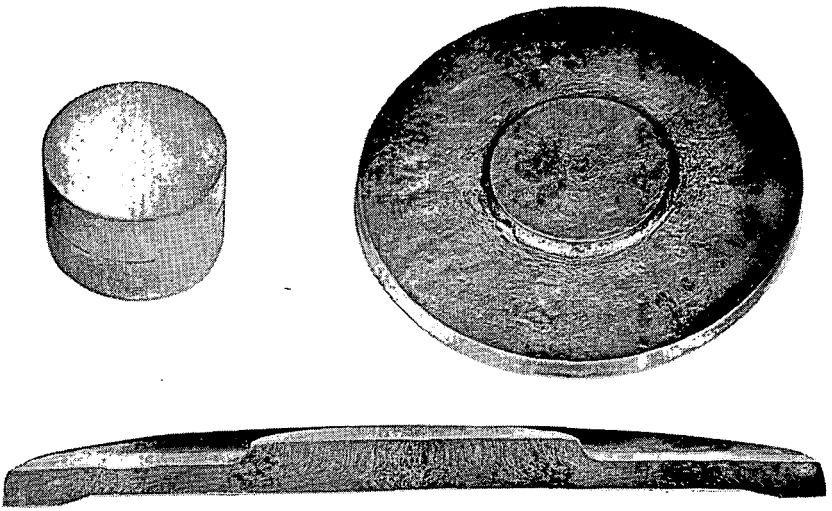
PART NO. 640961—DIAPHRAGM
Material—Halcomb 218
Billet Size—1.400 Dia. x .959 Lg.
Billet Coating—Copper Plate—Flash
Die Material—Halcomb 218—44 Rc
Punch Material—Halcomb 218—44 Rc
Die Coating—Colloidal Graphite in H20

Forging Temp.—Soak at 1650°F. for 30 Min. Heat to 2000°F. Hold 15 Min.
Dynapak Forged:
1 Blow at 600 PSI Fire Pressure
7" Total Stroke
Time From Furnace to Impact—9 Sec.



Dynapak-formed. Note direction of grain flow.

failed to attract much attention to the subject until recent years. Some operations such as piercing, dimpling, riveting and flaring were performed, but on a limited basis. What's happened is that Space Age demands for parts with difficult-to-form shapes of tougher, lighter materials, have spurred various government-sponsored HEF research projects. These studies have touched off an industry-wide chain reaction, and the scramble to tool up for HEF has begun.

How do you get started in HEF? Well, for explosive sheet metal forming, first you dig a hole in the ground and line it with reinforced concrete. Then you place a female half-die of the desired shape into the hole, place the metal to be formed over the die and fill the hole with water. Finally you hang an explosive charge over the whole setup, detonate it, and BOOM!—you're in business!

It's not quite that simple, of course, but darned near—if you know what you're doing. The configuration of the shot must be carefully calculated from certain precise parameters derived from an accumulated mass of know-how; literally the blood, sweat and tears of dedicated HEF researchers. And this is why they warn that explosive forming is definitely NOT a backyard, do-it-yourself project. It's a job for experts. (Unless there be those who care to run the risks of our hypothetical Chinese weapon-maker.)

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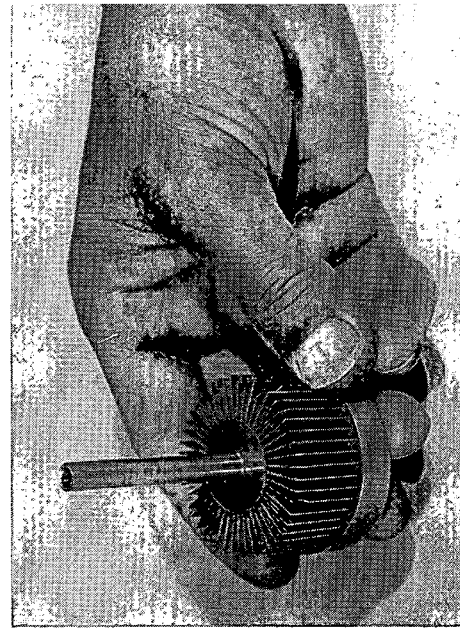

Some important considerations are: (1) the metallurgical properties of the metal to be formed; (2) the pressure required to form—based upon the type, amount and propagation rate of the explosive; (3) the distance of the explosive from the workpiece; and (4) the nature of the propagating or transfer medium.

Regarding the latter consideration, water is generally preferred to air because of its efficiency of energy transfer, its reduced compressibility and its impedance-matching characteristics. Underwater detonation minimizes both air and ground shock and eliminates the possibility of flying particles. Other materials used as a transfer medium include oil, rubber, plastics, talcum powder and clay, with *effectiveness evaluated in roughly* that order.

The explosives used may be either the low—deflagrating—or the high—detonating—types. The low explosives are usually black or smokeless powders which don't actually explode, but burn rather rapidly at the rate of several hundred feet per second. Expansion of the gases evolved produces a wave front which passes through the transfer medium, forcing the metal into the contour of the die. These explosives are generally used in smaller, closed-chamber, closed-die systems.

The high explosives used bear such familiar designations as Dynamite, TNT and Nitroglycerine. Others not so familiar still pack formidable but varying wallops: RDX, PETN, TETRYL, et cetera. They all detonate in millionths of a second, liberate energy at a constant rate regardless of the degree of confinement, and can produce shock waves in the order of millions of pounds per square inch. High explosive, open-die, underwater systems usually provide for the evacuation of air from the space between the workpiece and the die in order to prevent wrinkling or burning of the surface next to the die due to the heating of entrapped air.

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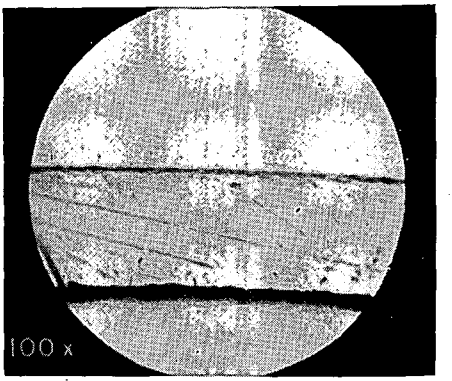
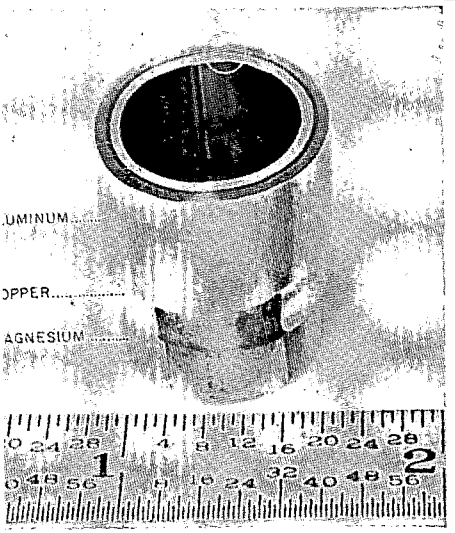
Left:
Vacuum tube anode formed in one blow first attempt, Dynapak.

Below:
Joining of dissimilar metals with Hi-Vo-Pac.

Right:
Micrograph of dissimilar metal junction.





Also, the die should be as smooth and clean as possible. Specks of dust or dirt—even fingerprints—are faithfully reproduced on the formed part!

Although the detonation rates of the high explosives are much higher than those of the low explosives, they don't necessarily produce more total power. The high explosives are usually fired as bare charges in open systems where they provide a high intensity pulse of relatively short duration. The low explosives are normally used in enclosed systems where the effect of containment allows their lower pressures to be sustained for longer periods of time. The size of the charge is carefully tailored to develop maximum energy at the workpiece. Winchester-Western has developed closed systems using blank

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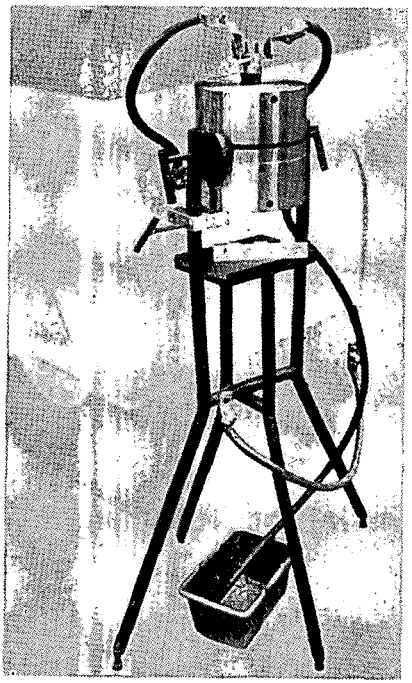
cartridges for the safe and convenient forming of smaller parts.

Another important factor is the shaping and placement of the charge, which has developed from a fine art into a science. For instance, a charge of Primacord hung in a circle over the workpiece has been found effective at General Dynamics/Astronautics, San Diego, for forming certain parts. (See illustration.)



Die holder, machine in background.

Another forming technique in use at Astronautics is called "decoction forming." The sheet metal workpiece is made air-tight over the top of the die. Air between the die and the workpiece is then evacuated, pulling the metal inward to be shaped by the die. Decoction forming is not exactly a high energy process, as the time required to form is considerably longer. However, a combination of decoction and explosive forming has been found effective. The metal is partially sucked inward, then completely formed by an explosive charge.

One of explosive forming's better selling points is that increasingly larger parts are being successfully made. At the General Dynamics/Astronautics installation, the original twelve foot tank will soon be dwarfed by a new one twice as big. Explosive forming also lends itself particularly well to the formation of spheres, hemispheres, domes and bulged shapes. (A technician has remarked: "My wife must have been explosively formed!")

The Aerojet-General Corporation of Azusa, California, is producing some beautiful seamless fifty-four inch missile pressure-vessel domes. Also, this is the outfit with (1) a camera capable of making 2,400,000 exposure a second; (2) some X-ray machines which deliver consecutive bursts of one ten-millionth of a second; and (3) a raster oscilloscope capable of measuring to within 20 milli-microseconds, which is 20 billionths of a second! Formidable research tools indeed, for a clearer glimpse into the temporal mysteries of shock wave development within an explosive charge.

Certain sheet metal parts may be explosively formed without dies, es-

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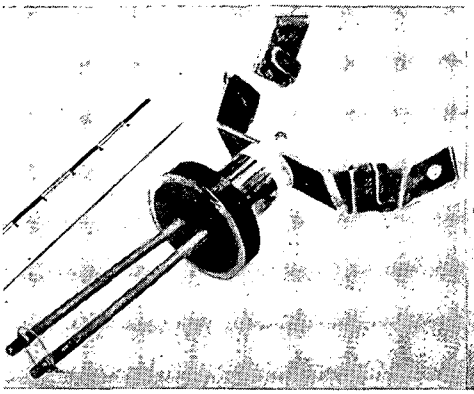
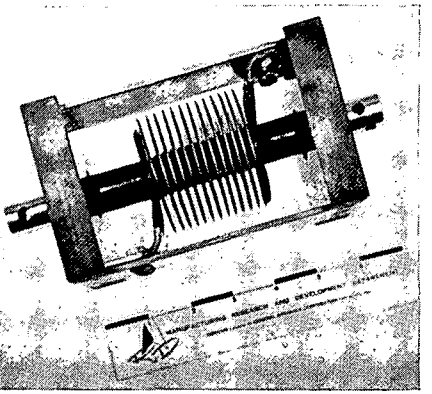


Hi-Vo-Pac spark gap, initiating wire.



Magnepak flux concentrator coil.

pecially if close tolerances are not a prime concern. The shape of the charge is important, and the explosion must be "aimed" to approximate the desired configuration. A midwestern manufacturer is reportedly producing some very satisfactory jet shroud liners by this method.

The Rohr Aircraft Corporation of Chula Vista, California, has explosively-formed thousands of sound suppressor tubes for the Boeing 707 Jetliner, and the original tools are still being used.

More explosively-formed articles now in use: skirts for the Polaris missile made from AM355 stainless steel welded cylinders . . . ball-sockets of L605 cobalt-base super-alloy for a Grumman Navy carrier plane . . . tailpipes for the Air Force's Q2C drone, from 347 CRES corrosion-resistant, non-magnetic, chrome-nickel steel. . . . Douglas DC-8 Jetliner de-icer cones from 6061-T6 corrosion-resistant aluminum alloy (formerly drop-hammer formed in five pieces, now explosively-formed in one piece) . . . Army helmets of titanium, formed in a transfer medium of alluvial sand . . . the bulkhead for the Titan missile . . . gore shims for the Saturn vehicle . . . and the bell-shaped LOX sump for Centaur, by General Dynamics/Astronautics.

Explosive forming has unquestionably made a definite impression upon the contemporary industrial scene. True, there's more to that lovely part than meets the eye. But it's also likely that it will be formed to finished size, to within a tolerance of ± 0.005 inches—or better, if desired—and with no annoying tendency to springback, as with conventional methods.

Another interesting version of HEF is the high energy impact method. Probably the most notable source of high impact energy presently available is the General Dynamics "Dynapak" machine. Unlike the vari-

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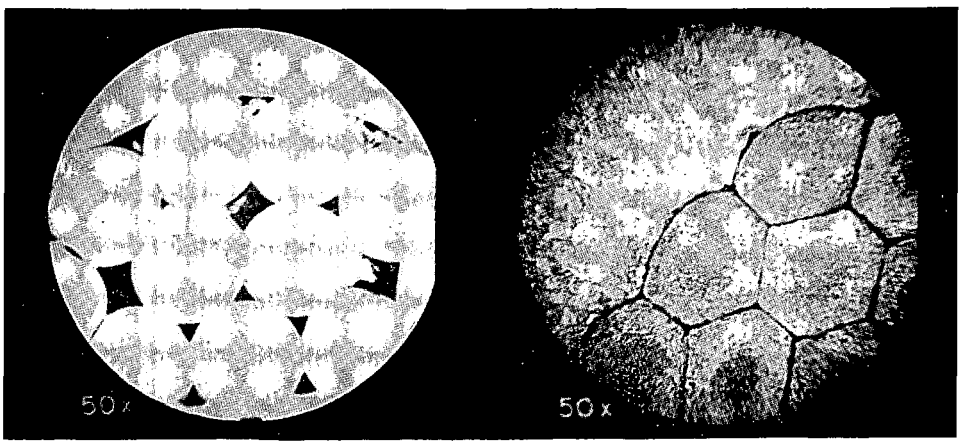
ous explosive forming methods, the Dynapak process employs no explosives, deriving its power solely from highly compressed gas. Also, whereas explosive forming generally produces large sheet metal parts using large open dies, Dynapak is used primarily to forge smaller, more complicated parts in closed die systems. The metal to be formed is forced into a state of plastic flow within the die by the sudden application of pressures in the order of 80,000 to 100,000 pounds per square inch. The die and workpiece may or not be heated, depending upon the degree of metal flow desired. Such high pressures within the die direct the grain flow pattern of the metal so that the grain size is refined, and the part is improved structurally. The metal is also prevented from folding back upon itself, which eliminates the possibility of voids and cracks. The closed-die setups permit the use of a variety of metal-shaping processes such as forging, upsetting, gathering and extruding.

Originally called the "HYGE (pronounced 'High-G') Dynactor," this apparatus has undergone considerable redesign. Whereas the original version employed a horizontal configuration, the improved Dynapak stands vertically, and looks somewhat like a modernized version of three post punch press. Two twelve-inch cylinders are mounted in line at the top of the machine. The upper cylinder contains compressed nitrogen at a pressure of 2,000 pounds per square inch, and a triggering valve. The lower cylinder contains the business end, a one-ton piston-ram.

When the triggering valve is opened, the escaping gas sends the



Cross section of cable, ordinary swaging.

Cross section of cable, Magnepak swaging.

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piston-ram hurtling downward like a hammer of Thor, at a velocity of several hundred feet a second—but with a complete stroke of only a few inches. WHAM!—it strikes a punch in a closed die, forming the part in 3 to 5 thousandths of a second.

In the case of conventional presses or drop hammers, the forces and loads are reacted by stiff structures rigidly attached to the floor. Dynapak, however, utilizes the principle of energy absorption rather than static reaction. The very high energy output is absorbed by a reaction system with a dynamic inertia mass consisting of a die holder called a "bolster" which hangs suspended by three pneumatic shock absorbers. Thus most of the machine "floats" with respect to the floor.

Dynapak is proving attractive from an economy standpoint. Die techniques used with the process are currently eliminating up to eighty per cent of the metal used in processing ordinary forgings. Chip and scrap waste is practically nil, as is subsequent trimming and machining of the finished part. Current overall production rates are about equal to those of a conventional forging press and are being improved.

Die breakage was somewhat of a problem in the early development of the machine, due mainly to a lack of data regarding its tremendous power potential. The new model sports a simpler but more precise adjustment for such factors as pressure and length of stroke, which provides the operator better control. Also—borrowing a leaf from the explosive forming book—they're now using a new water die which further dampens the shock and seems to have completely cured the breakage problem.

And it's a fact that the costs of Dynapak dies now run about ninety per cent less than those of conventional form dies.

Some of Dynapak's intriguing possibilities may be glimpsed from the early results of a feasibility study for the Eitel-McCullough Company. The illustration shows the first attempt to form the complete anode of a big power vacuum tube. The specs called for an "electron collector" to be formed in one blow from a round billet of oxygen-free copper. The vanes or fins were to have a tolerance of 20 thousandths at the hub, and 10 thousandths at the ends. Previous production of the part involved over twenty operations. Photos are not yet available of the perfected part, but it is reported that the results of the study are "very encouraging." Reportedly, the new tube with the Dynapak-formed anode refuses to become "gassy."

Sylvania's Dynapak machine is reportedly extruding some tubes from powdered tungsten, with a density approaching one hundred per cent. Subsequent sintering—heating—operations are eliminated.

Western Electric reports the compaction of 200-mesh Alnico 5 powder with a density of ninety-six per cent, in the production of large permanent magnets.

General Dynamics/Pomona's com-

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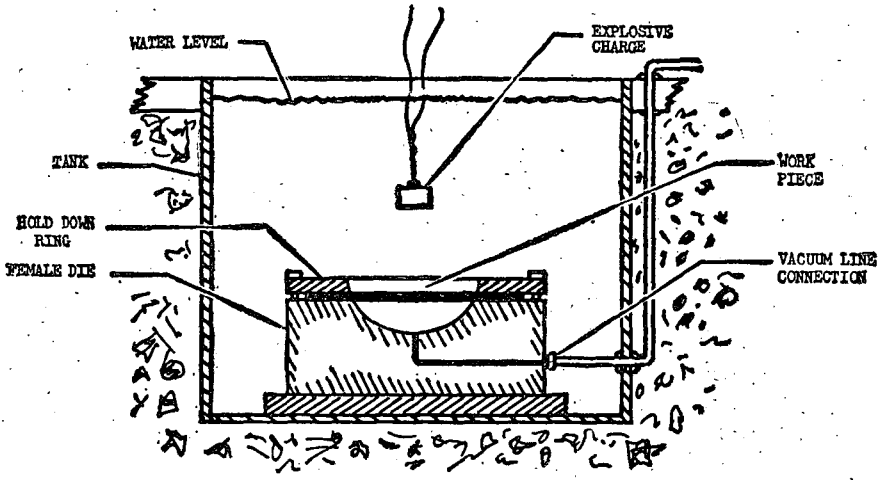

Underwater Sheet Metal Explosive Forming Setup.

paction of 200-mesh powdered potassium bromide has yielded an infrared lens of excellent optical quality in a pilot run for the Corning Glass Company.

One of Dynapak's merits, to some users, is the fact that you don't have to work outdoors in some back corner of the property, as with explosive forming. But there are other ways to bring HEF indoors. These involve the use of high voltage electricity as the energy source.

That the shock wave associated with electric capacitor discharge might be a usable source of high energy was apparently first recognized by the French team of Michele-Levy and Maraour in 1934. They proceeded to describe the heating to incandescence of a copper cylinder and a carbon thread when struck by shock-waves from a spark source. They may have got the basic idea from the German, Svedborg who produced metal suspensions by means of condenser discharge in a liquid, in 1905. From the thirties on, various researchers, mostly in this country and in the Soviet Union began to probe the mysteries of the high intensity electric spark. (And let's not forget Dr. Frankenstein of Transylvania, with his kites!)

It was found that when an electrically charged condenser with a potential difference of several kilovolts is suddenly discharged across a spark gap, a pressure pulse—actually a sound wave—propagates out from the spark radially, with great speed and force, as a high energy shock wave. Early attempts to convert this acoustical energy to a mechanical equivalent

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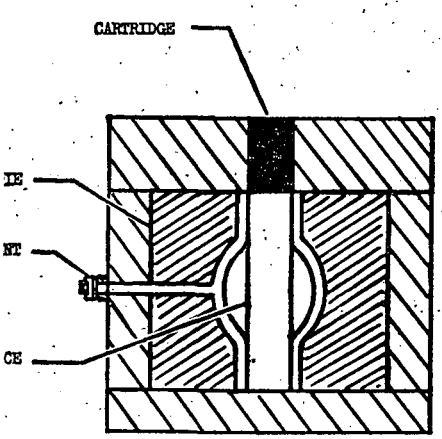
were pretty feeble, however, in the order of about one per cent efficiency. Früngel and Keller of Germany later raised this to fifty per cent by bursting a container of water with an underwater spark in 1957. They also presented an interesting comparison of spark discharge energy versus that of explosives. They calculated that the energy discharge of a 0.02 mf condenser at 20 kv could be made roughly equal to that of 1 mg of an explosive such as cast TNT.

One of their contemporaries, a W. Schaafs, studied the spark discharges in bromobenzine and trichloroethylene by means of high-speed radiographs. He determined the velocities of the shock waves which were evolved, and suggested that dynamic pressures of up to a million pounds per square inch were possible. Also, at about the same period, some Soviet researchers were busy recording shock wave velocities and pressures at the wave front in both air and liquids. Thermal action was also observed.



d Die Cartridge Explosive Forming.

The upshot of all this research was to more clearly define the energy parameters involved in both the "electrospark" (air) and the "electrohydraulic" or "hydrospark" (underwater) methods. Much knowledge was gained regarding the respective physical processes and the most efficient circuitry required for each. Although the underwater method requires a higher voltage applied as a quick, high-amplitude current impulse with a steep front, the short, intense hydraulic shock wave produced appears to provide more "brissance" or shattering action.

As might be expected, the principal factor in the determination of total work is the voltage applied, with energy increasing as the square of the voltage. Since we're dealing with electricity, the energy output of a system is readily calculable. For example: one watt-second equals one joule equals 0.74 foot-pounds. Therefore, in a 5400 watt-second machine, the maximum output would be: 5400/0.000040 (seconds) equals 135,000,000 joules equals 99,000,000 foot-pounds.

The focusing of energy is different in water than in air. In air, the mechanical action on the workpiece is in a direct line from the electrode; in water, the force is perpendicular to the line of action of the spark. Placement of dies and metals to be worked in relation to the spark is also important. Zones of action were discovered surrounding the spark. In the

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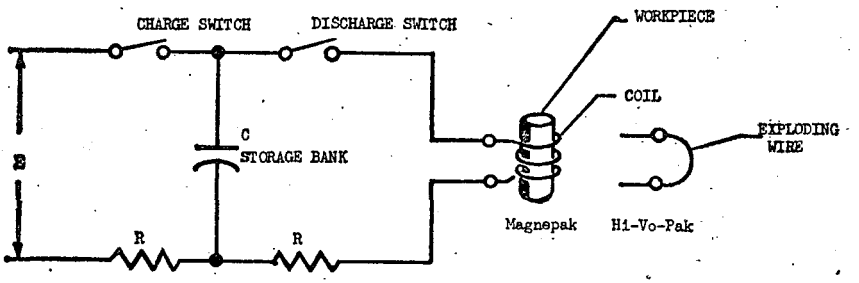
"zone of rupture" nearest the spark discharge area, nearly all materials are subdivided into small particles. A little farther out, cold-working occurs; metals placed here can be work-hardened. In the next zone out, elastic action takes place. Still further out is the zone of compression; here the pressure drops off sharply with distance.

the gap. The system was pioneered by the General Dynamics/Fort Worth division and is the brain child of R. H. Wesley and D. W. Cole. Research papers on electric wire explosions, notably those of the Physics Department of the College of Engineering at New York University and E. David of Germany provided source material and inspiration. Ac-



Electric Forming Generalized Circuit Diagram.

Quite a few outfits are now doing good work with spark-gap forming, including the Republic Aviation Corporation of Farmingdale, New York. The heart of their "spark bomb" rig is a bank of condensers in parallel which are charged to 30,000 volts and then discharged across a 1¼ inch gap in 40 millionths of a second. The machine will operate from any 110, 220 or 440 volt shop supply and has been used to produce a variety of parts, including some bulged shapes from tubes.

The General Dynamics "Hi-Vo-Pac" machine features an interesting variation in high energy electric forming—an exploding wire across

tually, the principle involved is sort of a combination of explosive and electrohydraulic forming. Somewhat lower voltages are used than with other underwater spark methods—around 4,000—but at a current of over a million amperes. All work is done indoors, and no explosives are used. A wire across the spark gap is vaporized by a sudden current surge to produce the high energy shock wave required for forming.

Let's watch what happens in slow motion: When the switch is thrown, a sudden flow of very high current heats the wire to a temperature of

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10,000 degrees Fahrenheit almost instantly. Inertial forces, assisted by magnetic fields, are able to contain the wire material in a solid state temporarily. But within 10 millimicroseconds enough energy has been placed in the wire to transform it into a highly plastic state. By now the current has risen to a peak value and is starting to fall off at a rate about twice as fast as its rise. During this period, however, large amounts of energy are still being placed in the wire, as the voltage is still continuous and at a high enough level to furnish sizable power inputs.

By 12 millimicroseconds, increased magnetic pressures, caused by the high current flow have raised the temperature to a point where the wire starts to vaporize; from a minimum at its surface, to a peak along its axis. Initially, the wire's surface began to vaporize off into the surrounding medium—water—at a pressure of about one atmosphere. But things are happening pretty fast, now; the next vapor layer hasn't moved much before the next underlying layer is vaporized. Huge pressures are building up, causing progressively higher vaporization temperatures—possibly in the order of millions of degrees! Increasing pressures of several hundred thousand atmospheres continue to hold the hot atoms—actually ions—in the lower layers close enough together to conduct for several millimicroseconds while the material is still in the vapor state.

But by 17 millimicroseconds enough energy has been developed to completely vaporize the wire. When this happens, explosive expansion begins, and the wire is transformed into a nonconducting gas, interrupting the current. The expanding metallic vapor radiates out as a powerful shock wave, pushing cooler vapor and water layers before it. A somewhat complicated rarefaction effect is also known to occur along with everything else that's happening, but its interest and importance is probably largely academic. Suffice it to say that great amounts of energy are applied to the workpiece.

In early work with Hi-Vo-Pac, wires of various materials were tried. But oddly, it has been established that the type of metal used in the initiating wire plays no significant part in the plasma phenomena of the spark channel. Aluminum wire and ribbon are being used quite successfully; one advantage being that wire and foil of such material may be easily shaped to a desired configuration, resulting in a shock front of specific shape. This technique has proven effective for concentrating the energies required for certain blanking or forming operations.

During these experiments, attempts were made to establish a swaging procedure using a two-inch diameter circle of 0.033 stainless steel wire. A one-inch tube of T-6 aluminum—with both ends taped to keep out water—was placed in the center of the circle described by the initiating wire. The tube was crushed impressively. The same principle was

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used to swage a knurled rod end in a T-3 aluminum tube and collars on electrical cable.

A more ambitious swaging experiment was performed using tubes of magnesium, copper and aluminum which slip-fit within each other. The same setup was used as in the previous examples, except that water was allowed to pass through the center tube to avoid crushing. After firing, it was obvious that the water did act as a mandrel and that the tubes had held their shape. Photomicrographs with up to two hundred times magnification fail to disclose any voids at the interface of the three layers of material. The perfect joining of such dissimilar metals should hold much promise for the field of welding and metal joining.

Another application of the high voltage forming principle—actually a variation of Hi-Vo-Pac—is seen in the General Dynamics "Magnepak" system. Differing from Hi-Vo-Pac only in the application of output energy, Magnepak is currently being used mostly for swaging operations.

Electromagnetic gadgets are pretty familiar stuff by now; motors, generators, transformers, et cetera. But not until recently has anybody been able to harness the principle for the purpose of forming metals. As an outgrowth of controlled fusion research by the General Atomics division of General Dynamics at San Diego, a "pinch effect" demonstration unit was assembled into an exhibit for the Atoms for Peace conference in Geneva. In 1958, General Dynamics/Convair of San Diego was assigned the task of developing production applications for use of the principle.

In the Magnepak setup, a work coil is substituted for the exploding wire used in Hi-Vo-Pac. Conductive metal parts are introduced into the coil in such a manner that they are flux-linked with it, acting to all intents and purposes as short-circuited secondary single-turn coils. This means that the primary work coil will carry maximum current, due to the "shorted" secondary. Consequently, when high electrical energy is applied to the work coil, a net resulting magnetizing force is applied to the workpiece. When this energy exceeds the material elastic limit of the workpiece, permanent deformation occurs. In other words, the stuff is "scrunched"!

Since the work coil, as well as the part, is subject to intense stress, considerable design effort has been put forth in the development of a reliable permanent-type coil. The "flux concentrators" designed by Dr. Kolm and his associates at M.I.T. were an inspiration in the development of a completely machined helix-type coil. The turns are insulated with epoxy and fiberglass and are baked dry; then the entire assembly is prestressed under compression with heavy end plates drawn together with steel bolts.

Another school of thought reasoned, "If the work coil wants to blow up, why not let it?" This led to the

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use of expendable-type coils for certain swaging applications. These consist of a few turns of cheap, plastic-insulated copper wire, wound on mandrels to the same size as the outside dimension of the part. Connection is made to the electrodes of the machine and the parts to be joined are inserted inside the turns.

The switch is thrown: Dunder und Blitzen!—the parts are beautifully joined. Needless to say a guard is necessary for protection against flying pieces of copper debris.

End fittings for the control rods in the control linkage system of the Convair 880 Jetliner are joined by Magnepak swaging. Tensile, fatigue, vibration and torque tests-to-destruction have broken the rods themselves, but never the joints.

At this stage of the game, industry and the designer are viewing HEF with cautious optimism. Production of a wide variety of articles is increasing steadily, and the proof-of-pudding results are impressive. The enthusiastic proponents of HEF feel at the very least, that any industrial process in the good old American tradition, namely Cheaper, Faster and Better, is bound to be accepted. They make it a point to tell you, however—perhaps diplomatically—that if the job can be performed satisfactorily by conventional methods, to stick with 'em. But they always hasten to add that if those methods leave something to be desired, why not take a look at HEF?

The advent of high energy forming may alter our basic concepts regarding the Ways of Making Things generally. What it amounts to is that the future potentialities of HEF, and its applications, are limited only by the imagination and ingenuity of the designer.

Automobile bodies are a "natural" for explosive forming, and already they're talking in terms of mass-produced, hemispherically-shaped houses. On a larger scale, carefully-tailored, "clean" atomic explosions might be used to shape enclosures for anything from Kublai Khan's "pleasure dome" to those domed cities under the sea, on the moon and on other planets.

(Note: The Analog Editorial for August suggested a super advertising "engraving" on the surface of the moon which would be visible from Earth, by means of a Monroe-effect explosion.)

The General Dynamics/Fort Worth division being in Texas, it is entirely appropriate that HEF engineers there "think big" about explosive forming.

"We'd like to use the Gulf of Mexico for a forming die!" says one.

Not to depreciate Texas, if such were possible, but another, considerably larger high energy forming job has already been done—the Solar System.

For that matter, how about the Universe itself? One school of thought holds that all the elements were formed in the first thirty minutes. What a beautiful job of dieless forming!

Or what if the Master Designer *did* use a die—maybe psi? ■

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When the glaciers go

▫ Man's total span of direct observation of the Universe—in the sense of consciously made and recorded observations—covers a span of about six thousand years. The "fixed stars" are not, of course, by any means fixed . . . save in the special sense that one of the high-speed electronic flash photographs "fixes" things. A bullet, photographed at a millionth of a second, appears fixed in space, too . . . but the bullet is, of course, traveling less than one one-hundredth the speed of many of the "fixed stars."

The very vaguest sort of mythical traditions suggest that, once upon a time, long ago, there was a flood. That the climate changed somehow, and it rained, and there was a flood.

Geological studies suggest that about twenty thousand years ago the climate changed a bit, the rain-belts moved, and it might be that at that time the oceans deepened slightly as water locked up in great glaciers flowed back to the sea. In a cooler period, the relatively shallow passage between the Gates of Hercules, between the Atlantic and the Mediterranean, might have been exposed dry land—and the Atlantic cut off from the Mediterranean basin. Perhaps there was a small salt lake or two in the great basin—a Great Salt Lake or Dead Sea that represented the dried-out left-over of the sea of non-glaciated times.

Until the glaciers melted, and the Atlantic regained contact with the great Mediterranean basin area.

That would constitute quite a

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flood, no doubt—one vast enough to leave traces through even a hundred generations of nomads without written records.

It's recognized now that the cubic miles of water still locked up in the great glaciers of Greenland, Antarctica and elsewhere would, if they all melted, raise the sea level some two hundred to three hundred feet, with serious effects on coastal areas . . .

But just what is a "coastal area" in the sense? When Hurricane Carla roared in from the Gulf of Mexico, people had to drive as much as fifty miles inland to get *twenty feet* higher elevation. How far up the Mississippi valley would a three hundred foot rise in ocean level push the Gulf of Mexico? My house is on the eastern slope of the Watchung hills in New Jersey, some thirty miles from the Atlantic coast. If the oceans rise two hundred feet, we'll be situated on an off-shore island, with two distinct island chains between us and the mainland, which will be about forty miles west of here! The entire industrial area of the New Jersey coastal plain will be gone.

What causes glaciation, though? It used to be held that the Earth's average temperature underwent enormous swings, such that at times Antarctica had a near-tropical climate, so that vast humid forests grew, and died, to make coal beds. That palms and giant ferns grew profusely in a semitropical Alaska. And then there were tremendous dips in temperature that sent glaciers rumbling down six thousand miles from the poles!

More recently, that's been coming under question. By careful study of the orientation of tiny particles of magnetic iron oxides that were deposited in silts washed down to ancient lakes hundreds and even thousands of megayears ago, we can determine which way was north at the time that silt formed. At least—which way was the magnetic north, and the best present hypotheses hold that the Earth's magnetic field is primarily linked to the rotation of the deep mass of the planet itself. It is *not* a surface effect, easily upset—not something that could, by accident, be an "east pole" or a "north-west pole".

The ancient sediments indicate that the north pole was, a few hundred megayears ago, located in Arizona.

Now the laws of gyroscopes being what they are, the possibility of the Earth's rotational mass being suddenly flipped over is a close approximation to zero. Any force capable of doing that would shatter the planet completely.

But the "rotational mass of the planet" is not that thin, wrinkled skin we know; that's only about thirty miles thick—thirty out of four thousand miles to Earth's center. There's nothing in the laws of gyroscopes that says that a coat of paint, poorly applied to the spinning wheel, couldn't slip around without detectably disturbing the rotation of the wheel proper. And there's nothing that says Earth's crust can't slip on the deeper mass of the planet! Since that crystal layer has as its main de-

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marking characteristic that it's shallow and light enough to act like a solid, while anything deeper, under the enormous pressures generated by the overlayers, flows like hot tar.

Metals don't have to be melted to make them flow—as witness any cold-rolling mill. Granite, too, will flow without being heated—Dr. Bridgeman and his associates in extreme pressure physics demonstrated that decades ago. Glass can't break when it's bent in a 90° angle—if it's locked in a space that maintains a pressure of, say, 2,000,000 pounds per square inch. It doesn't have room to crack!

Did Earth have such violent temperature swings that at times Antarctica was subtropical, and at others it is as we know it? Or . . . did the Earth's crust simply slip, like a badly applied and wrinkled coat of paint on the immense gyroscope underneath?

Surely the rotational axis of the Earth couldn't have wandered all the way down to Arizona! But . . . maybe Arizona wandered all the way down from the pole . . . ?

Right now, the north pole is stuck in a land-locked sea, with very narrow and quite shallow channels connecting it to the great heat reservoirs of the planet—the great oceans. The south pole, just now, is stuck in what appears to be a cleft continental landmass—which, of course, is a very poor heat reservoir, as compared to an ocean like the Pacific. If the Pacific wandered up to the north pole, the vast currents of water flowing to and from the Equatorial zone would make an ice-locked pole impossible. Look what the Gulf Stream does for Eastern Europe and the British Isles! There are palm trees growing along the streets of Galway on the west coast of Ireland—but, while I can't testify from direct knowledge, I do not believe palm trees are common in Labrador, which is somewhat south of Ireland!

Then there remains one other factor to consider. It's a very uncomfortable fact, because it has such disquieting implications.

In Siberia they have, for decades, been finding mammoths frozen in the icy gravels—mammoths preserved in deep-freeze since the ice-age descended.

These mammoths, though, died of cold, not of starvation. They're full-fleshed, not emaciated, and still preserved in their stomachs are the green vegetation they ate at their last meals.

This raises some highly interesting questions as to how fast the climate of an area on this planet can change. How long does it take to go from a moderate temperate-zone type climate, in a land that can support considerable numbers of gigantic herbivores, to a sub-sub-arctic climate with temperatures that must have been down around —75° or lower?

A mammoth is a huge mass of protoplasm. They had wool, a thick hide, and many tons of warm flesh, and if we imagine that, somehow, the temperature dropped one afternoon from, say, 40°—they were eating

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green vegetation, which hadn't been killed by frost when the catastrophe occurred—to say —100° in the course of one hour, how long would it take a mammoth's stomach to get down below freezing? For at least a time, the huge beast's metabolism would fight the terrible cold—they were mammals, and all the heat-generating mechanisms available to a giant mammal would start stoking up the furnaces full blast. No mild cold would kill so huge a creature; even animals as small as the Arctic hare readily survive temperatures below —40°, despite the problems of large skin area in proportion to heat-generating body volume.

But when the terrible cold finally overcame the mammalian heat-mechanisms—it would still take many hours for that vast carcass to cool down to freezing all the way through to the stomach.

And the vegetation is *still green!*

An elephant isn't a mammoth—but it would be interesting to know how long it would take an elephant, suddenly shoved out into an Antarctic mid-winter blizzard, to freeze solid all the way through.

How cold *did* it get? And how fast? So cold, and so fast, at least, that between the time a mammoth became uneasy about the strange things happening, and stopped eating as he began restlessly seeking some more secure place, and the time he froze solid, was not long enough to digest the greenness out of his last meal.

Seemingly cold can hit that fast.

Can temperature increase come that fast, too? That, by its nature, wouldn't leave permanently frozen evidence behind!

There is, though, the interesting fact that that business about the Atlantic flooding into the Mediterranean basin would account for the flood legends our Mediterranean-based culture has.

The flood-legends, however, are world-wide.

Those Siberian mammoths weren't quick-frozen by having Siberia skid a couple of thousand miles poleward in an afternoon, either. The deep layers of Earth are fluid . . . but not *that* fluid!

If the temperature can drop like that . . . can it also rise just as violently? And what happens if the glaciers melt not over the course of a century or two—but in a month or two?

We haven't the faintest idea what causes or ends a glaciation period . . . and we haven't any real knowledge of how fast it happens! ■

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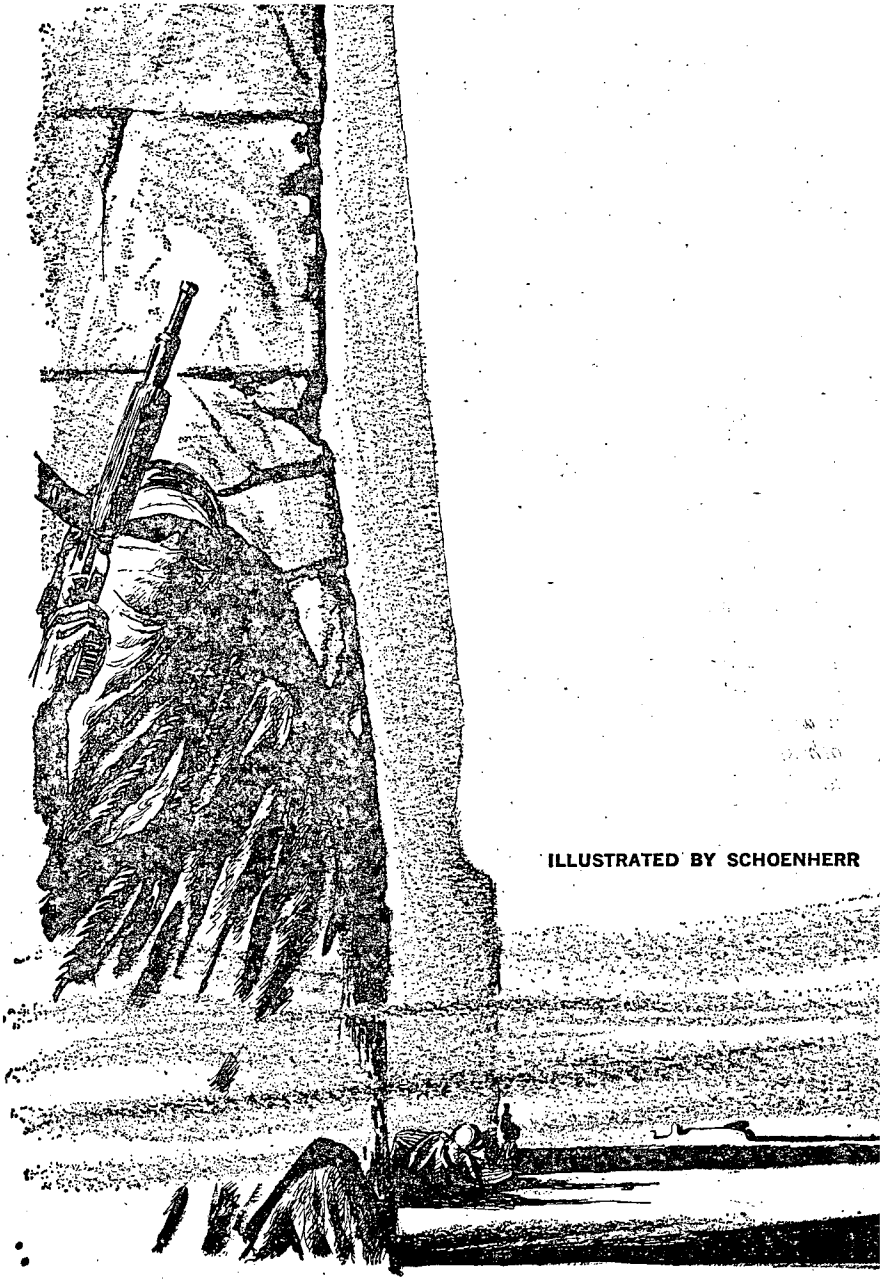

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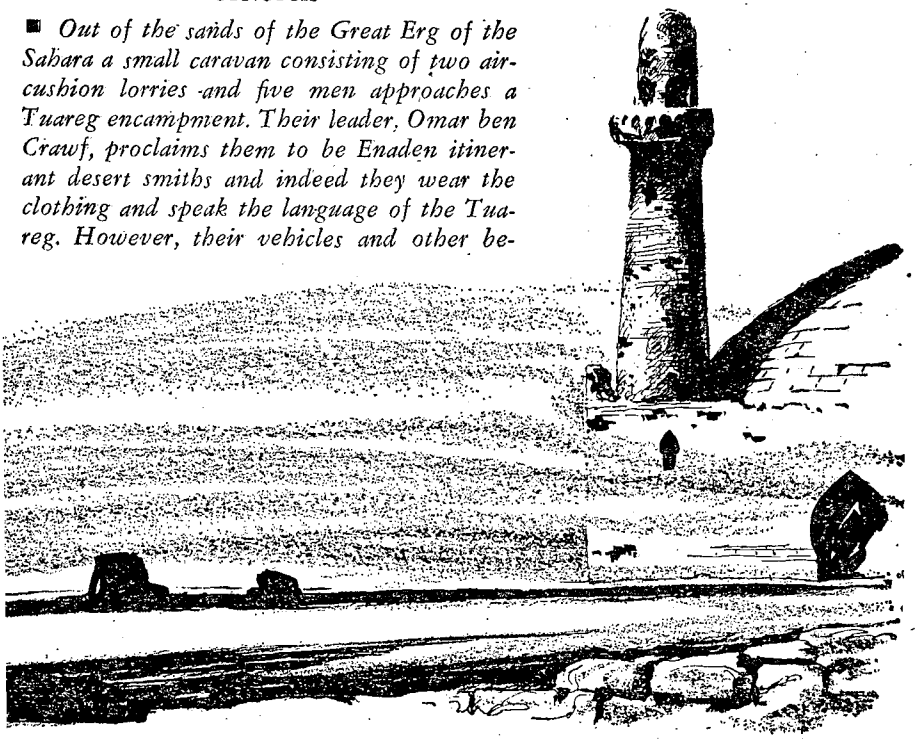
BLACK MAN'S BURDEN

Conclusion. The turmoil of Africa today will—if history means anything—get worse before it gets better. But a man who knew and understood history could, perhaps, shorten that turmoil . . .

BY MACK REYNOLDS

SYNOPSIS

■ *Out of the sands of the Great Erg of the Sahara a small caravan consisting of two air-cushion lorries and five men approaches a Tuareg encampment. Their leader, Omar ben Crawf, proclaims them to be Enaden itinerant desert smiths and indeed they wear the clothing and speak the language of the Tuareg. However, their vehicles and other be-*



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longings are far and beyond anything owned by Enaden before. They explain that they have earned these things by working on Sahara afforestation, on the new oases, the Niger dams and the other modernization projects that are sweeping North Africa.

To the consternation of the clan elders, they describe the teachings of the mysterious El Hassan who proclaims the ending of old institutions and the need for education, unity and a new society based on an individual's ability rather than on his position by birth in clan and tribe. The Enaden urge the younger Tuareg to give up nomad life, secure jobs in the new projects and to attend the new schools.

Omar ben Crawf wears a fetish on his wrist which speaks to him periodically in a language of the djinn. After several nights it evidently instructs him to leave, since he and his four companions pack and head eastward.

They take their place on the edge of a wadi and await the approach of a motor caravan of some forty Ara Union soldiers conveying arms into the Sahara. The other four in ambush, the supposed Enaden headman halts the convoy and discloses that he represents the Sahara Division of the African Development Project of the Reunited Nations and orders the convoy to return to its origin. They attempt to fire on him, and HOMER CRAWFORD's four team members obliterate them with such ultramodern weapons as their Tommy-Noiseless automatics. His four companions are ABE BAKER, ELMER ALLEN, KENNETH BALLALOU, and BEY-AG-AKHAMOUK, all American Negroes who have their degrees in sociology or political science except for Elmer Allen, a graduate of the University of Kingston, Jamaica.

A group of women are washing their clothes in the Niger River. One of them, Izubahil, has come to the town of Gao from out of the desert, a waif who has as yet been unable to find a man to take her into his hut or tent. The group is approached by two men dressed in the clothes of the West, who wish to hire a girl with the proviso that she drop the veil, discard the traditional haik costume and attend the new schools. All refuse the shameful proposal except Izubahil who agrees and follows the two strangers.

Inside the city's western type hotel, ISOBEL CUNNINGHAM discards her native disguise and greets her two teammates, CLIFFORD JACKSON and JACOB ARMSTRONG. It develops that they are working on a large scale rumor spreading campaign whose goal it is to break down prejudices against modern developments. In town after town Isobel puts on her "Cinderella act" in the first scene of which she is a native waif who comes out of the desert alone and unprotected by kinsmen. She drops the veil, discards the haik and goes off with the two strangers dressed in western garb and then returns in about six months, a

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superior, educated, adjusted person.

Leaving Gao, the team flies northwest to Kabara to put on one of the second "acts" of Isobel's show. Their discussion brings out the fact that all over North Africa various organizations are attempting to propel the area into the future. Complications are arising. A group of Cubans, in Sudan to teach new sugar refining methods, have been massacred. They also discuss the new leader, El Hassan, whom nobody seems to have seen but whose teachings are beginning to spread throughout the Sahara. Cliff Jackson also reveals that a certain Homer Crawford who has a rather high reputation for ruthlessness, has suggested that the field workers of the various organizations pushing progress in North Africa meet in Timbuktu to have a meeting and discuss mutual problems.

A juju man named DOLO ANAH approaches the villages of the Dogon in a helio-hopper. No one has ever before seen a man who flies seemingly personally, *and the Hogons, witchmen and headmen of the Dogon are terrified. Dolo Anah summons all the tribal leaders and their eldest sons as well to a conference and after demonstrating some unbelievable juju magic demands that they unite with their traditional enemies the Mosse and Tellum, forget their bloodfeuds and become one people. He also lays down the law in regard to their accepting the new schools.*

When the Dogon headmen protest that the Mosse and Tellum would not accept peace overtures, the juju man declares that his next stops are their villages and that none will dare oppose the orders from above. He then dismisses the Hogons, headmen and witchmen but keeps the eldest sons to speak to them further.

To them he reveals that he is not a juju man at all. That there is no such thing as juju. And he demonstrates the gadgets with which he has fooled and frightened the Dogon leaders. He tells the boys that a new wave is flowing over the desert and that they must scorn the old traditions, attend the schools and prepare to take their place in the new Africa.

The Emir Alhagi Mohammadu, Kudo of Kano, hereditary leader of Islam and State in his area of northern Nigeria, is contacted by two strangers who accuse him of corruption and diverting funds meant to improve the lot of his people. In a high rage he confronts them in their hotel suite and, facing their accusations, laughs them to scorn. His people are so backward as to be unable to understand such matters as his hiding money in Zürich, or accepting dash *from politicians and contractors in Largos. When they spell out all his corruption, in fury he admits it and tells them he is Kudo by divine right and anything he wishes to do to his debased followers is his own business. In short, he admits their charges but defies them to prove anything to his ignorant people. He refuses to go into self-exile, as they demand.*

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However, from the next room enters a third stranger who has just taken a sound movie of the whole scene. They set up a projector and run back everything that has transpired. Ignorant though his people may be, they are not so stupid as to stand for him when and if this film is shown through the villages.

The Kudo stumbles from the room, his face ashen.

At a gymkhana, a desert fiesta, and djemaa el kebar council of elders and chiefs of the Chaambra nomads of the northern Sahara, Abd-el-Kader the fiery and aggressive leader of the younger tribesmen, demands that the Chaambra who were ever warriors and nomads before the coming of the French, once again conquer the Sahara now that the once feared Camel Corps has been withdrawn. He makes an impassioned speech to the council, proclaiming the Chaambra tribes the Chosen of Allah and calling for a holy jehad.

Not only the French but all the western nations have withdrawn from North Africa, Abd-el-Kader points out. Now is the time for the Arab nomads to assert themselves. Let the Heratin serfs, and the Negroes who so recently were slaves, work on the new afforestation projects, the dams, the new oases and other developments, the Chaambra were meant to be masters and work is beneath them.

The council head turns to two strangers who thus far have been muffled in their burnouses and asks their opinion. They turn out to be Homer Crawford and Abe Baker, his beatnik speaking right-hand man.

Crawford refutes what Abd-el-Kader has said, pointing out that rule by the gun is and must be a thing of the past since man has finally achieved to the point where self destruction awaits him if he continues to try and solve his problems by force of arms. The American Negro and Abd-el-Kader quarrel and a duel with swords is the result when Crawford tells the Arab chief he has come to arrest him for attacks on the new development projects.

Using judo, Crawford defeats the Arab champion before the assembled tribesmen and he and his team haul Abd-el-Kader off in their air-cushion lorries.

Crawford and his team, Isobel Cunningham and hers, and approximately a hundred others, meet in Timbuktu for the conference of Sahara field workers. Represented are, not only Crawford's Reunited Nations teams, but Isobel's Africa for Africans Association, a sort of African Zionist organization which advocates that American and other foreign educated Negroes return to the home continent to help progress, the United Negro Missionaries, the Sahara Afforestation Project, the British Commonwealth African Department, the African Affairs sector of the French Community and others.

Crawford assumes chairmanship of the meeting and gives a summary of the reason for their being in North Africa. Shortly after gaining their in-

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dependence, it was found that the Africans presented a threat to international peace if the confusion on the Dark Continent continued. A have-not continent, bursting with population gains, the world was confronted with the need of helping Africa develop quickly—for the world's good. But the Africans, beset by old tribal society on one side and new half-baked supposedly democratic political institutions on the other, were rightfully suspicious of the white men of both East and West.

The answer? Those Negroes who had once been shipped out of Africa as slaves to America and other Western lands. Their descendents, now, were often men of education and training and capable of giving Africa the help it needs. Without clan, tribal or even national affiliations they are in a position to operate without prejudice.

Largely the meeting supports Crawford and is anxious to co-operate, but there is also some conflict. In fact, FREDRIC OSTRANDER of the C.I.A. comes to his feet and declares that the American State Department is opposed to such meetings as this being held. He contends that it is known that subversive elements are infiltrating these African development organizations.

When Crawford denies this, claiming the area too backward for Commie propaganda to be effective, Ostrander snaps, "Then who is subsidizing this El Hassan?"

And Homer Crawford and his team burst into laughter.

Part 2

V

When Homer Crawford, Abe Baker, Kenny Ballalou, Elmer Allen and Bey-ag-Akhamouk had laughed themselves out, Fredric Ostrander, the C.I.A. operative stared at them in anger. "What's so funny?" he snapped.

From his seat in the middle of the hall, Pierre Dupaine, operative for the French Community, said worriedly, "*Messieurs*, this El Hassan is not amusing. I, too, have heard of him. His followers are evidently sweeping through the Sahara. Everywhere I hear of him."

There was confirming murmur throughout the rest of the gathering.

Still chuckling, Homer Crawford said, a hand held up for quiet, "Please, everyone. Pardon the amusement of my teammates and myself. You see, there is no such person as El Hassan."

"To the contrary!" Ostrander snapped.

"No, please," Crawford said, grinning ruefully. "You see, my team *invented* him, some time ago."

Ostrander could only stare, and for once his position was backed by everyone in the hall, Crawford's team excepted.

Crawford said doggedly, "It came about like this. These people need a hero. It's in their nomad tradition. They need a leader to follow. Given a leader, as history has often demonstated, and the nomad will perform

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miracles. We wished to spread the program of the African Development Project. Such items as the need to unite, to break down the old boundaries of clan and tribe and even nation, the freeing of the slave and serf, the upgrading of women's position, the dropping of the veil and haik, the need to educate the youth, the desirability of taking jobs on the projects and to take up land on the new oases. But since we usually go about disguised as Enaden itinerant smiths, a poorly thought of caste, our ideas weren't worth much. So we invented El Hassan and everything we said we ascribed to him, this mysterious hero who was going to lead all North Africa to Utopia."

Jake Armstrong stood up and said, sheepishly, "I suppose that my team unknowingly added to this. We heard about this mysterious El Hassan and he seemed largely to be going in the same direction, and for the same reason—to give the rumors we were spreading weight—we ascribed the things we said to him."

Somebody farther back in the hall laughed and said, "So did I!"

Homer Crawford extended his hands in the direction of Ostrander, palms upward. "I'm sorry, sir. But there seems to be your mysterious subversive."

Angered, Ostrander snapped, "Then you admit that it was you, yourself, who have been spreading these subversive ideas?"

"Now, wait a minute," Crawford snapped in return. "I admit only to those slogans and ideas promulgated by the African Development Project. If any so-called subversive ideas have been ascribed to El Hassan, it has not been through my team. Frankly, I rather doubt that they have. These people aren't at any ethnic period where the program of the Soviet Complex would appeal. They're largely in a ritual-taboo tribal society and no one alleging any alliance whatsoever to Marx would contend that you can go from that primitive a culture to what the Soviets call communism."

"I'll take this up with my department chief," Ostrander said angrily. "You haven't heard the last of it, Crawford." He sat down abruptly.

Crawford looked out over the room. "Anybody else we haven't heard from?"

A middle-aged, heavy-set, Western dressed man came to his feet and cleared his throat. "Dr. Warren Harding Smythe, American Medical Relief. I assume that most of you have heard of us. An organization supported partially by government grant, partially by contributions by private citizens and institutions, as is that of Miss Isobel Cunningham's Africa for Africans Association." He added grimly, "But there the resemblance ends."

He looked at Homer Crawford. "I am to be added to the number not in favor of this conference. In fact, I am opposed to the presence of most of you here in Africa."

Crawford nodded. "You certainly have a right to your opinion, doctor. Will you elucidate?"

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Dr. Smythe had worked his way to the front of the room, now he looked out over the assemblage defiantly. "I am not at all sure that the task most of you work at is a desirable one. As you know, my own organization is at work bringing medical care to Africa. We build hospitals, clinics, above all medical schools. Not a single one of our hospitals but is a school at the same time."

Abe Baker growled, "Everybody knows and values your work, Doc, but what's this bit about being opposed to ours?"

Smythe looked at him distastefully. "You people are seeking to destroy the culture of these people, and, overnight, thrust them into the pressures of Twentieth Century existence. As a medical doctor, I do not think them capable of assimilating such rapid change and I fear for their mental health."

There was a prolonged silence.

Crawford said finally, "What is the alternative to the problems I presented in my summation of the situation that confronts the world due to the backward conditions of such areas as Africa?"

"I don't know, it isn't my field."

There was another silence.

Elmer Allen said finally, uncomfortably, "It *is* our field, Dr. Smythe."

Smythe turned to him, his face still holding its distaste. "I understand that the greater part of you are sociologists, political scientists and such. Frankly, ladies and gentlemen, I do not think of the social sciences as exact ones."

He looked around the room and added, deliberately, "In view of the condition of the world, I do not have a great deal of respect for the product of your efforts."

There was an uncomfortable stirring throughout the audience.

Clifford Jackson said unhappily, "We do what we must do, doctor. We do what we can."

Smythe eyed him. He said, "Some years ago I was impressed by a paragraph by a British writer named Huxley. So impressed that I copied it and have carried it with me. I'll read it now."

The heavy-set doctor took out his wallet, fumbled in it for a moment and finally brought forth an aged, many times folded, piece of yellowed paper.

He cleared his throat, then read: "*To the question* quis custodiet custodes?*—who will mount guard over our guardians, who will engineer the engineers?—the answer is a bland denial that they need any supervision. There seems to be a touching belief among certain Ph.Ds in sociology that Ph.Ds in sociology will never be corrupted by power. Like Sir Galahad's, their strength is the strength of ten because their heart is pure—and their heart is pure because they are scientists and have taken six thousand hours of social studies. Alas, high education is not necessarily a guarantee of higher virtue, or higher political wisdom.*"

The doctor finished and returned to his seat, his face still uncompromising.

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Homer Crawford chuckled ruefully. "The point is well taken, I suppose. However, so was the one expressed by Mr. Jackson. We do what we must, and what we can." His eyes went over the assembly. "Is there any other group from which we haven't heard?"

When there was silence, he added, "No group from the Soviet Complex?"

Ostrander, the C.I.A. operative, snorted. "Do you think they would admit it?"

"Or from the Arab Union?" Crawford pursued. "Whether or not the Soviet Complex has agents in this part of Africa, we know that the Arab Union, backed by Islam everywhere, has. Frankly, we of the African Development Project seldom see eye to eye with them which results in considerable discussion at Reunited Nations meetings."

There was continued silence.

Elmer Allen came to his feet and looked at Ostrander, his face surly. "I am not an advocate of what the Soviets are currently calling communism, however, I think a point should be made here."

Ostrander stared back at him unblinkingly.

Allen snorted, "I know what you're thinking. When I was a student I signed a few peace petitions, that sort of thing. How—or why they bothered—the C.I.A. got hold of that information, I don't know, but as a Jamaican I am a bit ashamed of Her Majesty's Government. But all this is beside the point."

"What is your point, Elmer?" Crawford said. "You speak, of course, as an individual not as an employee of the Reunited Nations nor even as a member of my team."

"Our team," Elmer Allen reminded him. He frowned at his chief, as though surprised at Crawford's stand. But then he looked back at the rest. "I don't like the fact that the C.I.A. is present at all. I grow increasingly weary of the righteousness of the prying for what it calls subversion. The latest definition of subversive seems to be any chap who doesn't vote either Republican or Democrat in the States, or Conservative in England."

Ostrander grunted scorn.

Allen looked at him again. "So far as this job is concerned—and by the looks of things, most of us will be kept busy at it for the rest of our lives—I am not particularly favorable to the position of either side in this never-warming cold war between you and the Soviet Complex. I have suspected for some time that neither of you actually want an ending of it. For different reasons, possibly. So far as the States are concerned, I suspect an end of your fantastic military budgets would mean a collapse of your economy. So far as the Soviets are concerned, I suspect they use the continual *threat* of attack by the West to keep up their military and police powers and suppress the freedom of their people. Wasn't it an old adage of the Romans that if you feared trouble at home, stir up war abroad? At any rate, I'd like to have

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it on the record that I protest the Cold War being dragged into our work in Africa—by either side."

"All right, Elmer," Crawford said, "you're on record. Is that all?"

"That's all," Elmer Allen said. He sat down abruptly.

"Any comment, Mr. Ostrander?" Crawford said.

Ostrander grunted, "Fuzzy thinking." Didn't bother with anything more.

The chairman looked out over the hall. "Any further discussion, any motions?" He smiled and added, "Anything—period?"

Finally Jake Armstrong came to his feet. He said, "I don't agree with everything Mr. Allen just said; however, there was one item where I'll follow along. The fact that most of us will be busy at this job for the rest of our lives—if we stick. With this in mind, the fact that we have lots of time, I make the following proposal. This meeting was called to see if there was any prospect of we field workers co-operating on a field worker's level, if we could in any way help each other, avoid duplication of effort, that sort of thing. I suggest now that this meeting be adjourned and that all of us think it over and discuss it with the other teams, the other field workers in our respective organizations. I propose further that another meeting be held within the year and that meanwhile Mr. Crawford be elected chairman of the group until the next gathering, and that Miss Cunningham be elected secretary. We can all correspond with Mr. Crawford, until the time of the next meeting, giving him such suggestions as might come to us. When he sees fit to call the next meeting, undoubtedly he will have some concrete proposals to put before us."

Isobel said, *sotto voce,* "Secretaries invariably do all the work, why is it that men always nominate a woman for the job?"

Jake grinned at her, "I'll never tell." He sat down.

"I'll make that a motion," Rex Donaldson clipped out.

"Second," someone else called.

Homer Crawford said, "All in favor?"

Those in favor predominated considerably.

They broke up into small groups for a time, debating it out, and then most left for various places for lunch.

Homer Crawford, separated from the other members of his team, in the animated discussions that went on about him, finally left the fascinating subject of what had happened to the Cuban group in Sudan, and who had done it, and went looking for his own lunch.

He strolled down the sand-blown street in the general direction of the smaller market, in the center of Timbuktu, passing the aged, wind corroded house which had once sheltered Major Alexander Gordon Laing, first white man to reach the forbidden city in the year 1826. Laing remained only three days before being murdered by the Tuareg who controlled

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the town at that time. There was a plaque on the door revealing those basic facts. Crawford had read elsewhere that the city was not captured until 1893 by a Major Joffre, later to become a Marshal of France and a prominent Allied leader in the First World War.

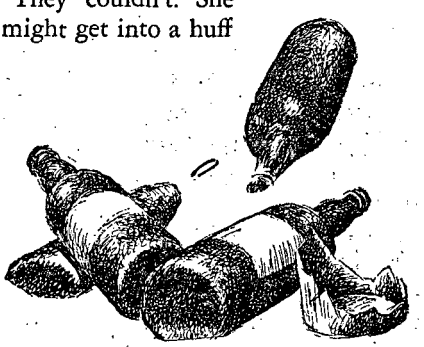
By chance he met Isobel in front of the large community butcher shop, still operated in the old tradition by the local Gabibi and Fulbe, formerly Songhoi serfs. He knew of a Syrian operated restaurant nearby, and since she hadn't eaten either they made their way there.

The menu was limited largely to local products. Timbuktu was still remote enough to make transportation of frozen foodstuffs exorbitant. While they looked at the bill of fare he told her a story about his first trip to the city some years ago while he was still a student.

He had visited the local American missionary and had dinner with the family in their home. They had canned plums for desert and Homer had politely commented upon their quality. The missionary had said that they should be good, he estimated the quart jar to be worth something like one hundred dollars. It seems that some kindly old lady in Iowa, figuring that missionaries in such places as Timbuktu must be in dire need of her State Fair prize winning canned plums, shipped off a box of twelve quarts to missionary headquarters in New York. At that time, France still owned French Sudan, so it was necessary for the plums to be sent to Paris, and thence, eventually to Dakar. At Dakar they were shipped through Senegal to Bamako by narrow gauge railroad which ran periodically. In Bamako they had to wait for an end to the rainy season so roads would be passable. By this time, a few of the jars had fermented and blown up, and a few others had been pilfered. When the roads were dry enough, a desert freight truck took the plums to Mopti, on the Niger River where they waited again until the river was high enough that a tug pulling barges could navigate, by slow stages, down to Kabara. By this time, one or two jars had been broken by inexpert handling and more pilfered. In Kabara they were packed onto a camel and taken to Timbuktu and delivered to the missionary. Total time elapsed since leaving Iowa? Two years. Total number of jars that got through? One.

Isobel looked at Homer Crawford when he finished the story, and laughed. "Why in the world didn't that missionary society refuse the old lady's gift?"

He laughed in return and shrugged. "They couldn't. She might get into a huff



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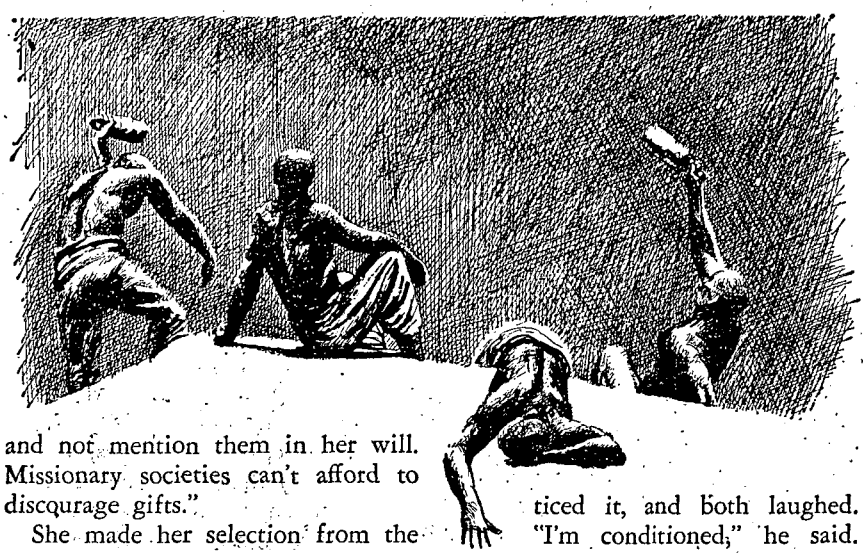

and not mention them in her will. Missionary societies can't afford to discourage gifts."

She made her selection from the menu, and told the waiter in French, and then settled back. She resumed the conversation. "The cost of maintaining a missionary in this sort of country must have been fantastic."

"Um-m-m," Crawford growled. "I sometimes wonder how many millions upon millions of dollars, pounds and francs have been plowed into this continent on such projects. This particular missionary wasn't a medical man and didn't even run a school and in the six years he was here didn't make a single convert."

Isobel said, "Which brings us to our own pet projects. Homer—I can call you Homer, I suppose, being your brand new secretary . . .

He grinned at her. "I'll make that concession."

". . . What's your own dream?"

He broke some bread, automatically doing it with his left hand, as proscribed in the Koran. They both noticed it, and both laughed.

"I'm conditioned," he said.

"Me, too," Isobel admitted. "It's all I can do to use a knife and fork."

He went back to her question, scowling. "My dream? I don't know. Right now I feel a little depressed about it all. When Elmer Allen spoke about spending the rest of our lives on this job, I suddenly realized that was about it. And, you know"—he looked up at her—"I don't particularly like Africa. I'm an American."

She looked at him oddly. "Then why stay here?"

"Because there's so much that needs to be done."

"Yes, you're right and what Cliff Jackson said to the doctor was correct, too. We all do what we must do and what we can do."

"Well, that brings us back to your question. What is my own dream? I'm afraid I'm too far along in life to acquire new ones, and my basic dream is an American one."

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"And that is—?" Isobel prompted.

He shrugged again, slightly uncomfortable under the scrutiny of this pretty girl. "I'm a sociologist, Isobel. I suppose I seek Utopia."

She frowned at him as though disappointed. "Is Utopia possible?"

"No, but there is always the search for it. It's a goal that recedes as you approach, which is as it should be. Heaven help mankind if we ever achieve it; we'll be through because there will be no place to go, and man needs to strive."

They had finished their soup and the entree had arrived. Isobel picked at it, her ordinarily smooth forehead wrinkled. "The way I see it, Utopia is not heaven. Heaven is perfect, but Utopia is an engineering optimum, the best-possible-human-techniques. Therefore we will not have *perfect* justice in Utopia, nor will *everyone* get the exactly proper treatment. We design for optimum—not perfection. But granting this, then attainment is possible."

She took a bite of the food before going on thoughtfully. "In fact, I wonder if, during man's history, he hasn't obtained his Utopias from time to time. Have you ever heard the adage that any form of government works fine and produces a Utopia provided it is managed by wise, benevolent and competent rulers?" She laughed and said mischievously, "Both Heaven and Hell are traditionally absolute monarchies—despotisms. The form of government evidently makes no difference, it's who runs it that determines."

Crawford was shaking his head. "I've heard the adage but I don't accept it. Under certain socio-economic conditions the best of men, and the wisest, could do little if they had the wrong form of government. Suppose, for instance, you had a government which was a military-theocracy which is more or less what existed in Mexico at the time of the Cortez conquest. Can you imagine such a government working efficiently if the socio-economic system had progressed to the point where there were no longer wars and where practically everyone were atheists, or, at least, agnostics?"

She had to laugh at his ludicrous example. "That's a rather silly situation, isn't it? Such wise, benevolent men, would change the governmental system."

Crawford pushed his point. "Not necessarily. Here's a better example. Immediately following the American Revolution, some of the best, wisest and most competent men the political world has ever seen were at the head of the government of Virginia. Such men as Jefferson, Madison, Monroe, Washington. Their society was based on chattel slavery and they built a Utopia *for themselves* but certainly not for the slaves who outnumbered them. Not that they weren't kindly and good men. A man of Jefferson's caliber, I am sure, would have done anything in the world for those darkies of his—except get off their backs. Except to grant them the liberty and the right to pursue happiness that he demanded for himself.

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He was blinded by self interest, and the interests of his class."

"Perhaps they didn't want liberty," Isobel mused. "Slavery isn't necessarily an unhappy life."

"I never thought it was. And I'm the first to admit that at a certain stage in the evolution of society, it was absolutely necessary. If society was to progress, then there had to be a class that was freed from daily drudgery of the type forced on primitive man if he was to survive. They needed the leisure time to study, to develop, to invent. With the products of their studies, they were able to advance all society. However, so long as slavery is maintained, be it necessary or not, you have no Utopia. There is no Utopia so long as one man denies another his liberty be it under chattel slavery, feudalism, or whatever."

Isobel said dryly, "I see why you say your Utopia will never be reached, that it continually recedes."

He laughed, ruefully. "Don't misunderstand. I think that particular goal can and will be reached. My point was that by the time we reach it, there will be a new goal."

The girl, finished with her main dish, sat back in her chair, and looked at him from the side of her eyes, as though wondering whether or not he could take what she was about to say in the right way. She said, slowly, "You know, with possibly a few exceptions, you can't enslave a man if he doesn't want to be a slave. For instance, the white man was never able to enslave the Amerind; he died before he would become a slave. The majority of Jefferson's slaves *wanted to be slaves.* If there were those among them that had the ability to revolt against slave psychology, a Jefferson would quickly promote such. A valuable human being will be treated in a manner proportionate to his value. A wise, competent, trustworthy slave became the major domo of the master's estate—with privileges and authority actually greater than that of free employees of the master."

Crawford thought about that for a moment. "I'll take that," he said. "What's the point you're trying to make?"

"I, too, was set a-thinking by some of the things said at the meeting, Homer. In particular, what Dr. Smythe had to say. Homer, are we sure these people *want* the things we are trying to give them?"

He looked at her uncomfortably. "No they don't," he said bluntly. "Otherwise we wouldn't be here, either your AFAA or my African Development Project. We utilize persuasion, skullduggery, and even force to subvert their institutions, to destroy their present culture. Yes. I've known this a long time."

"Then how do you justify your being here?"

He grinned sourly. "Let's put it this way. Take the new government in Egypt. They send the army into some of the small back-country towns with bayoneted rifles, and orders to use

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them if necessary. The villagers are forced to poison their ancient village wells—one of the highest of imaginable crimes in such country, imposed on them ruthlessly. Then they are forced to dig new ones in new places that are not intimately entangled with their own sewage drainage. Naturally they hate the government. In other towns, the army has gone in and, at gun point, forced the parents to give up their children, taken the children away in trucks and 'imprisoned' them in schools. Look, back in the States we have trouble with the Amish, who don't want their children to be taught modern ways. What sort of reaction do you think the tradition-ritual-tabu-tribesmen of the six thousand year old Egyptian culture have to having modern education imposed on their children?"

Isobel was frowning at him.

Crawford wound it up. "That's the position we're in. That's what we're doing. Giving them things they need, in spite of the fact they don't want them."

"But *why?*"

He said, "You know the answer to that as well as I do. It's like giving medical care to Typhoid Mary, in spite of the fact that she didn't want it and didn't believe such things as typhoid microbes existed. We had to protect the community against her. In the world today, such backward areas as Africa are potential volcanoes. We've got to deal with them before they erupt."

The waiter came with the bill and Homer took it.

Isobel said, "Let's go Dutch on that."

He grinned at her. "Consider it a donation to the AFAA."

Out on the street again, they walked slowly in the direction of the old administration buildings where both had left their means of transportation.

Isobel, who was frowning thoughtfully, evidently over the things that had been said, said, "Let's go this way. I'd like to see the old Great Mosque, in the Dyingerey Ber section of town. It's always fascinated me."

Crawford said, looking at her and appreciating her attractiveness, all over again, "You know Timbuktu quite well, don't you?"

"I've just finished a job down in Kabara, and it's only a few miles away."

"Just what sort of thing do you do?"

She shrugged and made a moue. "Our little team concentrates on breaking down the traditional position of women in these cultures. To get them to drop the veil, go to school. That sort of thing. It's a long story and—"

Homer Crawford suddenly and violently pushed her to the side and to the ground and at the same time dropped himself and rolled frantically to the shelter of an adobe wall which had once been part of a house but now was little more than waist high.

"Down!" he yelled at her.

She bug-eyed him as though he gone suddenly mad.

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There was a heavy, stub-nosed gun suddenly in his hand. He squirmed forward on elbows and bell, until he reached the corner.

"What's the matter?" she blurted.

He said grimly, "See those three holes in the wall above you?"

She looked up, startled.

He said, grimly, "They weren't there a moment ago."

What he was saying, dawned upon her. "But . . . but I heard no shots."

He cautiously peered around the wall, and was rewarded with a puff of sand inches from his face. He pulled his head back and his lips thinned over his teeth. He said to her, "Efficiently silenced guns have been around for quite a spell. Whoever that is, is up there in the mosque. Listen, beat your way around by the back streets and see if you can find the members of my team, especially Abe Baker or Bey-ag-Akhamouk. Tell them what happened and that I think I've got the guy pinned down. That mosque is too much out in the open for him to get away without my seeing him."

"But . . . but who in the world would want to shoot you, Homer?"

"Search me," he growled. "My team has never operated in this immediate area."

"But then, it must be someone who was at the meeting."

VI

That is was," Oomer said grimly. "Now, go see if you can find my lads, will you? This joker is going to fall right into our laps. It's going to be interesting to find out who hates the idea of African development so much that they're willing to commit assassination."

But it didn't work out that way.

Isobel found the other teammates one by one, and they came hurrying up from different directions to the support of their chief. They had been a team for years and operating as they did and where they did, each man survived only by selfless co-operation with all the others. In action, they operated like a single unit, their ability to co-operate almost as though they had telepathic communication.

From where he lay, Homer Crawford could see Bey-ag-Akhamouk, Tommy-Noiseless in hands, snake in from the left, running low and reaching a vantage point from which he could cover one flank of the ancient adobe mosque. Homer waved to him and Bey made motions to indicate that one of the others was coming in from the other side.

Homer waited for a few more minutes, then waved to Bey to cover him. The streets were empty at this time of midday when the Sahara sun drove the town's occupants into the coolness of dark two-foot-thick walled houses. It was as though they were operating in a ghost town. Homer came to his feet and handgun in fist made a dash for the front entrance.

Bey's light automatic *flic flic flicked* its excitement and dust and dirt enveloped the wall facing Craw-

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ford. Homer reached the doorway, stood there for a full two minutes while he caught his breath. From the side of his eye he could see Elmer Allen, his excellent teeth bared as always when the Jamaican went into action, come running up to the right in that half crouch men automatically go into in combat, instinctively presenting as small a target as possible. He was evidently heading for a side door or window.

The object now was to refrain from killing the sniper. The important thing was to be able to question him. Perhaps here was the answer to the massacre of the Cubans. Homer took another deep breath, smashed the door open with a heavy shoulder and dashed inward and immediately to one side. At the same moment, Abe Baker, Tommy-Noiseless in hand, came in from the rear door, his eyes darting around trying to pierce the gloom of the unlighted building.

Elmer Allen erupted through a window, rolled over on the floor and came to rest, his gun trained.

"Where is he?" Abe snapped.

Homer motioned with his head. "Must be up in the remains of the minaret."

Abe got to the creaking, age-old stairway first. In cleaning out a hostile building, the idea is to move fast and keep on the move. Stop, and you present a target.

But there was no one in the minaret.

"Got away," Homer growled. His face was puzzled. "I felt sure we'd have him."

Bey-ag-Akhamouk entered. He grunted his disappointment. "What happened, anyway? That girl Isobel said a sniper took some shots at you and you figure it must've been somebody at the meeting."

"Somebody at the meeting?" Abe said blankly. "What kind of jazz is that? You flipping, man?"

Homer looked at him strangely. "Who else could it be, Abe? We've never operated this far south. None of the inhabitants in this area even know us, and it certainly couldn't have been an attempt at robbery."

"There were some cats at that meeting didn't appreciate our ideas, man, but I can't see that old preacher or Doc Smythe trying to put the slug on you."

Kenny Ballalou came in on the double, gun in hand, his face anxious.

Abe said sarcastically, "Man, we'd all be dead if we had to wait on you."

"That girl Isobel. She said somebody took a shot at the chief."

Homer explained it, sourly. A sniper had taken a few shots at him, then managed to get away.

Isobel entered, breathless, followed by Jake Armstrong.

Abe grunted, "Let's hold another convention. This is like old home town week."

Her eyes went from one of them to the other. "You're not hurt?"

"Nobody hurt, but the cat did all the shooting got away," Abe said unhappily.

Jake said, and his voice was worried. "Isobel told me what happened. It sounds insane."

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They discussed it for a while and got exactly nowhere. Their conversation was interrupted by a clicking at Homer Crawford's wrist. He looked down at the tiny portable radio.

"Excuse me for a moment," he said to the others and went off a dozen steps or so to the side.

They looked after him.

Elmer Allen said sourly, "Another assignment. What we need is a union."

Abe adopted the idea. "Man! Time and a half for overtime."

"With a special cost of living clause—" Kenny Ballalou added.

"And housing and dependents allotment!" Abe crowed.

They all looked at him.

Bey tried to imitate the other's beatnik patter. "Like, you got any dependents, man?"

Abe made a mark in the sand on the mosque's floor with the toe of his shoe, like a schoolboy up before the principal for an infraction of rules, and registered embarrassment. "Well, there's that cute little Tuareg girl up north."

"Ha!" Isobel said. "And all these years you've been leading me on."

Homer Crawford returned and his face was serious. "That does it," he muttered disgustedly. "The fat's in the fire."

"Like, what's up, man?"

Crawford looked at his right-hand man. "There are demonstrations in Mopti. Riots."

"Mopti?" Jake Armstrong said, surprised. "Our team was working there just a couple of months ago. I thought everything was going fine in Mopti."

"They're going fine, all right," Crawford growled. "So well, that the local populace wants to speed up even faster."

They were all looking their puzzlement at him.

"The demonstrations are in favor of El Hassan."

Their faces turned blank.

Crawford's eyes swept his teammates. "Our instructions are to get down there and do what we can to restore order. Come on, let's go. I'm going to have to see if I can arrange some transportation. It'd take us two days to get there in our outfits."

Jake Armstrong said, "Wait a minute, Homer. My team was heading back for Dakar for a rest and new assignments. We'd be passing Mopti anyway. How many of you are there, five? If you don't haul too much luggage with you, we could give you a lift."

"Great," Homer told him. "We'll take you up on that. Abe, Elmer, let's get going. We'll have to repack. Bey, Kenny, see about finding some place we can leave the lorries until we come back. This job shouldn't take more than a few days at most."

"Huh," Abe said. "I hope you got plans, man. How do you go about stopping demonstrations in favor of a legend you created yourself?"

Mopti, also on the Niger, lies approximately three hundred kilometers to the south and slightly west of

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Timbuktu, as the bird flies. However, one does not travel as the bird flies in the Niger bend. Not even when one goes by aircraft. A forced landing in the endless swamps, bogs, shallow lakes and river tributaries which make up the Niger at this point, would be suicidal. The whole area is more like the Florida Everglades than a river, and a rescue team would be hard put to find your wreckage. There are no roads, no railroads. Traffic follows the well marked navigational route of the main channel.

Homer Crawford had been sitting quietly next to Cliff Jackson who was piloting. Isobel and Jake Armstrong were immediately behind them and Abe and the rest of Crawford's team took up the remainder of the aircraft's eight seats. Abe was regaling the others with his customary chaff.

Out of a clear sky, Crawford said bitterly, "Has it occurred to any of you that what we're doing here in North Africa is committing genocide?"

The others stared at him, taken aback. Isobel said, "I beg your pardon?"

"Genocide," Crawford said bitterly. "We're doing here much what the white men did when they cleared the Amerinds from the plains, the mountains and forests of North America."

Isobel, Cliff and Jake frowned their puzzlement. Abe said, "Man, you just don't make sense. And, among other things, there're more Indians in the United States than there was when Columbus landed."

Crawford shook his head. "No. They're a different people. Those cultures that inhabited the United States when the first white men came, are gone." He shook his head as though soured by his thoughts. "Take the Sioux. They had a way of life based on the buffalo. So the whites deliberately exterminated the buffalo. It made the plains Indians' culture impossible. A culture based on buffalo herds cannot exist if there are no buffalo."

"I keep telling you, man, there's more Sioux now than there were then."

Crawford still shook his head. "But they're a different people, a different race, a different culture. A mere fraction, say ten per cent, of the original Sioux, might have adapted to the new life. The others beat their heads out against the new ways. They fought—the Sitting Bull wars took place after the buffalo were already gone—they drank themselves to death on the white man's firewater, they committed suicide; in a dozen different ways they called it quits. Those that survived, the ten per cent, were the exceptions. They were able to adapt. They had a built-in genetically-conferred self discipline enough to face the new problems. Possibly eighty per cent of their children couldn't face the new problems either and they in turn went under. But by now, a hundred years later, the majority of the Sioux nation have probably adapted. But, you see, the point I'm trying to make? They're not the *real* Sioux, the original

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Sioux; they're a new breed. The plains living, buffalo based culture, Sioux are all dead. The white men killed them."

Jake Armstrong was scowling. "I get your point, but what has it to do with our work here in North Africa?"

"We're doing the same thing to the Tuareg, the Teda and the Chaambra, and most of the others in the area in which we operate. The type of human psychology that's based on the nomad life can't endure settled community living. Wipe out the nomad way of life and these human beings must die."

Abe said, unusually thoughtful, "I see what you mean, man. *Fish gotta swim, bird gotta fly*—and nomad gotta roam. He flips if he doesn't."

Homer Crawford pursued it. "Sure, there'll be Tuareg afterward . . . but all descended from the fraction of deviant Tuareg who were so abnormal—speaking from the Tuareg viewpoint—that they liked settled community life." He rubbed a hand along his jawbone, unhappily. "Put it this way. Think of them as a tribe of genetic claustrophobes. No matter what a claustrophobe promises, he can't work in a mine. He has no choice but to break his promise and escape . . . or kill himself trying."

Isobel was staring at him. "What you say, is disturbing, Homer. I didn't come to Africa to destroy a people."

He looked back at her, oddly. "None of us did."

Cliff said from behind the aircraft's controls, "If you believe what you're saying, how do you justify being here yourself?"

"I don't know," Crawford said unhappily. "I don't know what started me on this kick, but I seem to have been doing more inner searching this past week or so than I have in the past couple of decades. And I don't seem to come up with much in the way of answers."

"Well, man," Abe said. "If you find any, let us know."

Jake said, his voice warm, "Look Homer, don't beat yourself about this. What you say figures, but you're got to take it from this angle. The plains Indians had to go. The world is developing too fast for a few thousand people to tie up millions of acres of some of the most fertile farm land anywhere, because they needed it for their game—the buffalo—to run on."

"Um-m-m," Homer said, his voice lacking conviction.

"Maybe it's unfortunate the *way* it was done. The story of the American's dealing with the Amerind isn't a pretty one, and usually comfortably ignored when we pat ourselves on the back these days and tell ourselves what a noble, honest, generous and peace loving people we are. But it did have to be done, and the job we're doing in North Africa has to be done, too."

Crawford said softly, "And sometimes it isn't very pretty either."

Mopti as a town had grown. Once a small river port city of about five thousand population, it had been a

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river and caravan crossroads somewhat similar to Timbuktu, and noted in particular for its spice market and its Great Mosque, probably the largest building of worship ever made of mud. Plastered newly at least twice a year with fresh adobe, at a distance of only a few hundred feet the Great Mosque, in the middle of the day and in the glare of the Sudanese sun, looks as though made of gold. From the air it is more attractive than the grandest Gothic cathedrals of Europe.

Isobel pointed. "There, the Great Mosque."

Elmer Allen said, "Yes, and there.

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See those mobs?" He looked at Homer Crawford and said sourly, "Let's try and remember who it was who first thought of the El Hassan idea. Then we can blame it on him."

Kenny Ballalou grumbled, "We all thought about it. Remember, we pulled into Tessalit and found that prehistoric refrigerator that worked on kerosene and there were a couple of dozen quarts of Norwegian beer, of all things, in it."

"And we bought them all," Abe recalled happily. "Man, we hung one on."

Homer Crawford said to Cliff, "The Mopti airport is about twelve miles over to the east of the town."

"Yeah, I know. Been here before," Cliff said. He called back to Ballalou, "And then what happened?"

"We took the beer out into the desert and sat on a big dune. You can just begin to see the Southern Cross from there. Hangs right on the horizon. Beautiful."

Bey said, "I've never heard Kenny wax poetic before. I don't know which sounds more lyrical, though, that cold beer or the Southern Cross."

Kenny said, "Anyway, that's when El Hassan was dreamed up. We kicked the idea around until the beer was all gone. And when we awoke in the morning, complete with hangover, we had the gimmick which we hung all our propaganda on."

"El Hassan is turning out to be a hangover all right," Elmer Allen grunted, choosing to misinterpret his teammate's words. He peered down below. "And there the poor blokes are, rioting in favor of the product of those beer bottles."

"It was crazy beer, man," Abe protested. "Real crazy."

Homer Crawford said, "I wish headquarters had more information to give us on this. All they said was there were demonstrations in favor of El Hassan and they were afraid if things went too far that some of the hard work that's been done here the past ten years might dissolve in the excitement; Dogon, Mosse, Tellum, Sonrai start fighting among each other."

Jake Armstrong said, "That's not my big worry. I'm afraid some ambitious lad will come along and supply what these people evidently want."

"How's that?" Cliff said.

"They want a leader. Somone to come out of the wilderness and lead them to the promised land." The older man grumbled sourly. "All your life you figure you're in favor of democracy. You devote your career to expanding it. Then you come to a place like North Africa. You're just kidding yourself. Democracy is meaningless here. They haven't got to the point where they can conceive of it."

"And—" Elmer Allen prodded.

Jake Armstrong shrugged. "When it comes to governments and social institutions people usually come up with what they want, sooner or later. If those mobs down there want a leader, they'll probably wind up with one." He grunted deprecation. "And then probably we'll be able to say, Heaven help them."

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Isobel puckered her lips. "A leader isn't necessarily a misleader, Jake."

"Perhaps not necessarily," he said. "However, it's an indication of how far back these people are, how much work we've still got to do, when that's what they're seeking."

"Well, I'm landing," Cliff said. "The airport looks free of any kind of manifestations."

"That's a good word," Abe said. "Manifestations. Like, I'll have to remember that one. Man's been to school and all that jazz."

Cliff grinned at him. "Where'd you like to get socked, beatnik?"

"About two feet above my head," Abe said earnestly.

The aircraft had hardly come to a halt before Homer Crawford clipped out, "All right, boys, time's a wasting. Bey, you and Kenny get over to those administration buildings and scare us up some transportation. Use no more pressure than you have to. Abe, you and Elmer start getting our equipment out of the luggage—"

Jake Armstrong said suddenly, "Look here, Homer, do you need any help?"

Crawford looked at him questioningly.

Jake said, "Isobel, Cliff, what do you think?"

Isobel said quickly, "I'm game. I don't know what they'll say back at AFAA headquarters, though. Our cooperating with a Sahara Development Project team."

Cliff scowled. "I don't know. Frankly, I took this job purely for the dough, and as outlined it didn't include get roughed up in some riot that doesn't actually concern the job."

"Oh, come along, Cliff," Isobel urged. "It'll give you some experience you don't know when you'll be able to use."

He shrugged his acceptance, grudgingly.

Jake Armstrong looked back at Homer Crawford. "If you need us, we're available."

"Thanks," Crawford said briefly, and turned off the unhappy stare he'd been giving Cliff. "We can use all the manpower we can get. You people ever worked with mobs before?"

Bey and Kenny climbed from the plane and made their way at a trot toward the airport's administration buildings. Abe and Elmer climbed out, too, and opened the baggage compartment in the rear of the aircraft.

"Well, no," Jake Armstrong said. "It's quite a technique. Mostly you have to play it by ear, because nothing is so changeable as the temper of a mob. Always keep in mind that to begin with, at least, only a small fraction of the crowd is really involved in what's going on. Possibly only one out of ten is interested in the issue. The rest start off, at least, as idle observers, watching the fun. That's one of the first things you've got to control. Don't let the innocent bystanders become excited and get into the spirit of it all. Once they do, then you've got a mess on your hands."

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Isobel, Jake and Cliff listened to him in fascination.

Cliff said uncomfortably, "Well, what do we do to get the whole thing back to tranquillity? What I mean is, how do we end these demonstrations?"

"We bore them to tears," Homer growled.

They looked at him blankly.

"We assume leadership of the whole thing and put up speakers."

Jake protested, "You sound as though you're sustaining not placating it."

"We put up speakers and they speak and speak, and speak. It's almost like a fillibuster. You don't say anything particularly interesting, and certainly nothing exciting. You agree with the basic feeling of the demonstrating mob, certainly you say nothing to antagonize them. In this case we speak in favor of El Hassan and his great, and noble, and inspiring, and so on and so forth, teachings. We speak in not too loud a voice, so that those in the rear have a hard time hearing, if they can hear at all."

Cliff said worriedly, "Suppose some of the hotheads get tired of this and try to take over?"

Homer said evenly, "We have a couple of bully boys in the crowd to take care of them."

Jake twisted his mouth, in objection. "Might that no strike the spark that would start up violence?"

Homer Crawford grinned and began climbing out of the plane. "Not with the weapons we use."

"Weapons!" Isobel snapped. "Do you intend to use weapons on those poor people? Why, it was you yourself, you and your team, who started this whole El Hassan movement. I'm shocked. I've heard about your reputation, you and the Sahara Development Project teams. Your ruthlessness—"

Crawford chuckled ruefully and held up a hand to stem the tide. "Hold it, hold it," he said. "These are special weapons, and, after all, we've got to keep those crowds together long enough to bore them to the point where they go home."

Abe came up with an armful of what looked something like tent-poles. "The quarterstaffs, eh, Homer?"

"Um-m-m," Crawford said. "Under the circumstances."

"Quarterstaffs?" Cliff Jackson ejaculated.

Abe grinned at him. "Man, just call them pilgrim's staffs. The least obnoxious looking weapon in the world." He looked at Cliff and Jake. "You two cats been checked out on quarterstaffs?"

Jake said, "The more I talk to you people, the less I seem to understand what's going on. Aren't quarterstaffs what, well, Robin Hood and his Merry Men used to fight with?"

"That's right," Homer said. He took one from Abe and grasping it expertly with two hands whirled it about, getting its balance. Then suddenly, he drooped, leaning on it as a staff. His face expressed weariness. His youth and virility seemed to drop away and suddenly he was an

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aged religious pilgrim as seen throughout the Moslem world.

"I'll be damned," Cliff blurted. "Oop, sorry Isobel."

"I'll be damned, too," Isobel said. "What in the world can you do with that, Homer? I was thinking in terms of you mowing those people down with machine guns or something."

Crawford stood erect again laughingly, and demonstrated. "It's probably the most efficient handweapon ever devised. The weapon of the British yeoman. With one of these you can disarm a swordsman in a matter of seconds. A good man with a quarterstaff can unhorse a knight in armor and batter him to death, in a minute or so. The only other handweapon capable of countering it is another quarterstaff. Watch this, with the favorable two-hand leverage the ends of the staff can be made to move at invisibly high speeds."

Bey and Kenny drove up in an aged wheeled truck and Abe and Elmer began loading equipment.

Crawford looked at Bey who said apologetically, "I had to liberate it. Didn't have time for all the dickering the guy wanted to go through."

Crawford grunted and looked at Isobel. "Those European clothes won't do. We've got some spare things along. You can improvise. Men and women's clothes don't differ that much around here."

"I'll make out all right," Isobel said. "I can change in the plane."

"Hey, Isobel," Abe called out. "Why not dress up like one of these Dogan babes?"

"Some chance," Isobel hissed menacingly at him. "A strip tease you want, yet. You'll see me in a haik and like it, wise guy."

"Shucks," Abe grinned.

Crawford looked critically at the clothing of Jake and Cliff. "I suppose you'll do in western stuff," he said. "After all, this El Hassan is supposed to be the voice of the future. A lot of his potential followers will already be wearing shirts and pants. Don't look *too* civilized, though."

When Isobel returned, Crawford briefed his seven followers. They were to operate in teams of two. One of his men, complete with quarterstaff would accompany each of the others. Abe with Jake, Bey with Cliff, and he'd be with Isobel. Elmer and Kenny would be the other twosome, and, both armed with quarterstaffs would be troubleshooters.

"We're playing it off the cuff," he said. "Do what comes naturally to get this thing under control. If you run into each other, co-operate, of course. If there's trouble, use your wrist radios." He looked at Abe and Bey. "I know you two are packing guns underneath those *gandouras*. I hope you know enough not to use them."

Abe and Bey looked innocent.

Homer turned and led the way into the truck. "O.K., let's get going."

VII

Driving into town over the dusty, pocked road, Homer gave the newcomers to his group more background

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on the care and control of the genus *mob*. He was obviously speaking through considerable experience.

"Using these quarterstaffs brings to mind some of the other supposedly innoxious devices used by police authorities in controlling unruly demonstrations," he said. "Some of them are beauties. For instance, I was in Tangier when the Moroccans put on their revolution against the French and for the return of the Sultan. The rumor went through town that the mob was going to storm the French Consulate the next day. During the night, the French brought in elements of the Foreign Legion and entrenched the consulate grounds. But their commander had another problem. Journalists were all over town and so were tourists. Tangier was still supposedly an international zone and the French were in no position to slaughter the citizens. So they brought in some special equipment. One item was a vehicle that looked quite a bit like a gasoline truck, but was filled with water and armored against thrown cobblestones and such. On the roof of the cabin was what looked something like a fifty caliber but which was actually a hose which shot water at terrific pressure. When the mob came, the French unlimbered this vehicle and all the journalists could say was that the mob was dispersed by squirting water on it, which doesn't sound too bad after all."

Isobel said, "Well, certainly that's preferable to firing on them."

Homer looked at her oddly. "Possibly. However, I was standing next to the Moorish boy who was cut entirely in half by the pressure spray of water."

The expression on the girl's face sickened.

Homer said, "They had another interesting device for dispersing mobs. It was a noise bomb. The French set off several."

"A noise bomb?" Cliff said. "I don't get it."

"They make a tremendous noise, but do nothing else. However, members of the mob who aren't really too interested in the whole thing—just sort of along for the fun—figure that things are getting earnest and that the troops are shelling them. So they remember some business they had elsewhere and take off."

Isobel said suddenly, "You like this sort of work, don't you?"

Elmer Allen grunted bitterly.

"No," Homer Crawford said flatly. "I don't. But I like the goal."

"And the end justifies the means?"

Homer Crawford said slowly, "I've never answered that to my own satisfaction. But I'll say this. I've never met a person, no matter how idealistic, no matter how much he played lip service to the contention that the ends do not justify the means, who did not himself use the means he found available to reach the ends he believed correct. It seems to be a matter of each man feeling the teaching applies to everyone else, but that he is free to utilize any means to achieve his own noble ends."

"Man, all that jazz is too much for me," Abe said.

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They were entering the outskirts of Mopti. Small groups of obviously excited Africans of various tribal groups, were heading for the center of town.

"Abe, Jake," Crawford said. "We'll drop you here. Mingle around. We'll hold the big meeting in front of the Great Mosque in an hour or so."

"Crazy," Abe said, dropping off the back of the truck which Kenny Ballalou, who was driving, brought almost to a complete stop. The older Jake followed him.

The rest went on a quarter of a mile and dropped Bey and Cliff.

Homer said to Kenny, "Park the truck somewhere near the spice market. Preferably inside some building, if you can. For all we know, they're already turning over vehicles and burning them."

Crawford and Isobel dropped off near the pottery market, on the banks of the Niger. The milling throngs here were largely women. Elements of half a dozen tribes and races were represented.

Homer Crawford stood a moment. He ran a hand back over his short hair and looked at her. "I don't know," he muttered. "Now I'm sorry we brought you along." He leaned on his staff and looked at her worriedly. "You're not very . . . ah, husky, are you?"

She laughed at him. "Get about your business, sir knight. I spent nearly two weeks living with these people once. I know dozens of them by name. Watch this cat operate, as Abe would say."

She darted to one of the overturned pirogues which had been dragged up on the bank from the river, and climbed atop it. She held her hands high and began a stream of what was gibberish to Crawford who didn't understand Wolof, the Senegalese lingua franca. Some elements of the crowd began drifting in her direction. She spoke for a few moments, the only words the surprised Homer Crawford could make out were *El Hassan.* And she used them often.

She switched suddenly to Arabic, and he could follow her now. The drift of her talk was that word had come through that El Hassan was to make a great announcement in the near future and that meanwhile all his people were to await his word. But that there was to be a great meeting before the Mosque within the hour.

She switched again to Songhoi and repeated substantially what she'd said before. By now she had every woman hanging on her words.

A man on the outskirts of the gathering called out in high irritation, "But what of the storming of the administration buildings? Our leaders have proclaimed the storming of the reactionaries!"

Crawford, leaning heavily on the pilgrim staff, drifted over to the other. "Quiet, O young one," he said. "I wish to listen to the words of the girl who tells of the teachings of the great El Hassan."

The other turned angrily on him. "Be silent thyself, old man!" He raised a hand as though to cuff the American.

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Homer Crawford neatly rapped him on the right shin bone with his quarterstaff to the other's intense agony. The women who witnessed the brief spat dissolved in laughter at the plight of the younger man. Homer Crawford drifted away again before the heckler recovered.

He let Isobel handle the bulk of the reverse-rabble rousing. His bit was to come later, and as yet he didn't want to reveal himself to the throngs.

They went from one gathering place of women to another. To the spice market, to the fish and meat market, to the bathing and laundering locations along the river. And everywhere they found animated groups of women, Isobel went into her speech.

At one point, while Homer stood idly in the crowd, feeling its temper and the extent to which the girl was dominating them, he felt someone press next to him.

A voice said, "What is the plan of operation, Yank?"

Homer Crawford's eyebrows went up and he shot a quick glance at the other. It was Rex Donaldson of the Commonwealth African Department. The operative who worked as the witchman, Dolo Anah. Crawford was glad to see him. This was Donaldson's area of operations, the man must have got here almost as soon as Crawford's team, when he had heard of the trouble.

Crawford said in English, "They've been gathering for an outbreak of violence, evidently directed at the Reunited Nations projects administration buildings. I've seen a few banners calling for El Hassan to come to power, Africa for the Africans, that sort of thing."

The small Bahamian snorted. "You chaps certainly started something with this El Hassan farce. What are your immediate plans? How can I co-operate with you?"

A teenage boy who had been heckling Isobel, stooped now to pick up some dried cow dung. Almost absently, Crawford put his staff between the other's legs and tripped him up, when the lad sprawled on his face the American rapped him smartly on the head.

Crawford said, "Thanks a lot, we can use you, especially since you speak Dogon, I don't think any of my group does. We're going to hold a big meeting in front of the square and give them a long monotonous talk, saying little but sounding as though we're promising a great deal. When we're taken most of the steam out of them, we'll locate the ringleaders and have a big indoor meeting. My boys will be spotted throughout the gang. They'll nominate me to be spokesman, and nominate each other to be my committee and we'll be sent to find El Hassan and urge him to take power. That should keep them quiet for a while. At least long enough for headquarters in Dakar to decide what to do."

"Good Heavens," Donaldson said in admiration. "You Yanks are certainly good at this sort of thing."

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"Takes practice," Homer Crawford said. "If you want to help, ferret out the groups who speak Dogon and give them the word."

Out of a sidestreet came running Abe Baker at the head of possibly two or three hundred arm waving, shouting, stick brandishing Africans. A few of them had banners which were being waved in such confusion that nobody could read the words inscribed. Most of them seemed to be younger men, even teen-agers.

"Good Heavens," Donaldson said again.

At first snap opinion, Crawford thought his assistant was being pursued and started forward to the hopeless rescue, but then he realized that Abe was heading the mob. Waving his staff, the New Yorker was shouting slogans, most of which had something to do with "El Hassan" but otherwise were difficult to make out.

The small mob charged out of the street and through the square, still shouting. Abe began to drop back into the ranks, and then to the edge of the charging, gesticulating crowd. Already, though, some of them seemed to be slowing up, even stopping and drifting away, puzzlement or frustration on their faces.

Those who were still at excitement's peak, charged up another street at the other side of the square.

In a few moments, Abe Baker came up to them, breathing hard and wiping sweat from his forehead. He grinned wryly. "Man, those cats are way out. This is really Endsville." He looked up at where Isobel was haranguing her own crowd, which hadn't been fazed by the men who'd charged through the square going nowhere. "Look at old Isobel up there. Man, this whole town's like a combination of Hyde Park and Union Square. You oughta hear old Jake making with a speech."

"What just happened?" Homer asked, motioning with his head to where the last elements of the mob Abe'd been leading were disappearing down a dead-end street.

"Ah, nothing," Abe said, still watching Isobel and grinning at her. "Those cats were the nucleus of a bunch wanted to start some action. Burn a few cars, raid the library, that sort of jazz. So I took over for a while, led them up one street and down the other. I feel like I just been star at a track meet."

"Good Heavens," Donaldson said still again.

"They're all scattered around now," Abe explained to him. "Either that or their tongues are hanging out to the point they'll have to take five to have a beer. They're finished for a while."

Isobel finished her little talk and joined them. "What gives now?" she asked.

Rex Donaldson said, "I'd like to stay around and watch you chaps operate. It's fascinating. However, I'd better get over to the park. That's probably where the greater number of the Dogon will be." He grumbled sourly, "I'll roast those blokes with a half dozen bits of magic and send them all back to Sangha. It'll be donkey's years before they ever show

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face around here again." He left them.

Homer Crawford looked after him. "Good man," he said.

Abe had about caught his breath. "What gives now, man?" he said. "I ought to get back to Jake. He's all alone up near the mosque."

"It's about time all of us got over there," Crawford said. He looked at Isobel as they walked. "How does it feel being a sort of reverse agent provocateur?"

Her forehead was wrinkled, characteristically. "I suppose it has to be done, but frankly, I'm not too sure just what we are doing. Here we go about pushing these supposed teachings of El Hassan and when we're taken up by the people and they actually attempt to accomplish what we taught them, we draw in on the reins."

"Man, you're right," Abe said unhappily. He looked at his chief. "What'd you say, Homer?"

"Of course she's right," Crawford growled. "It's just premature, is all. There's no program, no plan of action. If there was one, this thing here in Mopti might be the spark that united all North Africa. As it is, we have to put the damper on it until there is a definite program." He added sourly, "I'm just wondering if the Reunited Nations is the organization that can come up with one. And, if it isn't, where is there one?"

The mosque loomed up before them. The square before it was jam packed with milling Africans.

"Great guns," Isobel snorted,

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"there're more people here than the whole population of Mopti. Where'd they all come from?"

"They've been filtering in from the country," Crawford said.

"Well, we'll filter 'em back," Abe promised.

They spotted a ruckus and could see Elmer Allen in the middle of it, his quarterstaff flailing.

"On the double," Homer bit out, and he and Abe broke into a trot for the point of conflict. The idea was to get this sort of thing over as quickly as possible before it had a chance to spread.

They arrived too late. Elmer was leaning on his staff, as though needing it for support, and explaining mildly to two men who evidently were friends of a third who was stretched out on the ground, dead to the world and with a nasty lump on his shaven head.

Homer came up and said to Elmer, in Songhai, "What has transpired, O Holy One?" He made a sign of obeisance to the Jamacian.

The two Africans were taken aback by the term of address. They were unprepared to continue further debate, not to speak of physical action, against a holy man.

Elmer said with dignity, "He spoke against El Hassan, our great leader."

For a moment the two Africans seemed to be willing to deny that, but Abe Baker took up the cue and turned to the crowd that was beginning to gather. He held his hands out, palms upward questioningly, "And why should these young men beset a Holy One whose only crime is to love El Hassan?"

The crowd began to murmur and the two hurriedly picked up their fallen companion and took off with him.

Homer said in English, "What really happened?"

"Oh, this chap was one of the hot heads," Elmer explained. "Wanted some immediate action. I gave it to him."

Abe chuckled, "Holy One, yet."

Spotted through the square, holding forth to various gatherings of the mob were Jake Armstrong, Kenny Ballalou and Cliff Jackson. Even as Homer Crawford sized up the situation and the temper of the throngs of tribesmen, Bey entered the square from the far side at the head of two or three thousand more, most of whom were already beginning to look bored to death from talk, talk, talk.

Isobel came up and looked questioningly at Homer Crawford.

He said, "Abe, get the truck and drive it up before the entrance to the mosque. We'll speak from that. Isobel can open the hoe down, get the crowd over and then introduce me."

Abe left and Crawford said to Isobel, "Introduce me as Omar ben Crawf, the great friend and assistant of El Hassan. Build it up."

"Right," she said.

Crawford said, "Elmer first round up the boys and get them spotted

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through the audience. You're the cheerleaders and also the sergeants at arms, of course. Nail the hecklers quickly, before they can get organized among themselves. In short, the standard deal." He thought a moment. "And see about getting a hall where we can hold a meeting of the ringleaders, those are the ones we're going to have to cool out."

"Wizard," Elmer said and was gone on his mission.

Isobel and Homer stood for a moment, waiting for Abe and the truck.

She said, "You seem to have this all down pat."

"It's routine," he said absently. "The brain of a mob is no larger than that of its minimum member. Any disciplined group, almost no matter how small can model it to order."

"Just in case we don't have the opportunity to get together again, what happens at the hall meeting of ringleaders? What do Jake, Cliff and I do?"

"What comes naturally," Homer said. "We'll elect each other to the most important positions. But everybody else that seems to have anything at all on the ball will be elected to some committee or other. Give them jobs compiling reports to El Hassan or something. Keep them busy. Give Reunited Nations headquarters in Dakar time to come up with something."

She said worriedly, "Suppose some of these ringleaders are capable, aggressive types and won't stand for us getting all the important positions?"

Crawford grunted. "We're *more* aggressive and more capable. Let my team handle that. One of the boys will jump up and accuse the guy of being a spy and an enemy of El Hassan, and one of the other boys will bear him out, and a couple of others will hustle him out of the hall." Homer yawned. "It's all routine, Isobel."

Abe was driving up the truck.

Crawford said, "O.K., let's go, gal."

"Roger," she said, climbing first into the back of the vehicle and then up onto the roof of the cab.

Isobel held her hands high above her head and in the cab Abe bore down on the horn for a long moment.

Isobel shrilled, "Hear what the messenger from El Hassan has come to tell us! Hear the friend and devoted follower of El Hassan!"

At the same time, Jake, Kenny, and Cliff discontinued their own harangues and themselves headed for the new speaker.

They stayed for three days and had it well wrapped up in that time. The tribesmen, bored when the excitement fell away and it became obvious that there were to be no further riots, and certainly no violence, drifted back to their villages. The city dwellers returned to the routine of daily existence. And the police, who had mysteriously disappeared from the streets at the height of the demonstrations, now magically reappeared and began asserting their authority somewhat truculently.

At the hall meetings, mighty slo-

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gans were drafted and endless committees formed. The more articulate, the more educated and able of the demonstrators were marked out for future reference, but for the moment given meaningless tasks to keep them busy and out of trouble.

On the fourth day, Homer Crawford received orders to proceed to Dakar, leaving the rest of the team behind to keep an eye on the situation.

Abe groaned, "There's luck for you. Dakar, nearest thing to a good old sin city in a thousand miles. And who gets to go? Old sour puss, here. Got no more interest in the hot spots—"

Homer said, "You can come along, Abe."

Kenny Ballalou said, "Orders were only you, Homer."

Crawford growled, "Yes, but I have a suspicion I'm being called on the carpet for one of our recent escapades and I want backing if I need it." He added, "Besides, nothing is going to happen here."

"Crazy man," Abe said appreciatively.

Jake said, "We three were planning to head for Dakar today ourselves. Isobel, in particular, is exhausted and needs a prolonged rest before going out among the natives any more. You might as well continue to let us supply your transportation."

"Fine," Homer told him. "Come on Abe, let's get our things together."

"What do we do while you chaps are gone?" Elmer Allen said sourly. "I wouldn't mind a period in a city myself."

"Read a book, man," Abe told him. "Improve your mind."

"I've read a book," Elmer said glumly. "Any other ideas?"

Dakar is a big, bustling, prosperous and modern city shockingly set down in the middle of the poverty that is Africa. It should be, by its appearance, on the French Riviera, on the California coast, or possibly that of Florida, but it isn't. It's in Senegal, in the area once known as French West Africa.

Their aircraft swept in and landed at the busy airport.

They were assigned an African Development Project air-cushion car and drove into the city proper.

Dakar boasts some of the few skyscrapers in all Africa. The Reunited Nations occupied one of these in its entirety. Dakar was the center of activities for the whole Western Sahara and down into the sudan. Across the street from its offices, a street still named Rue des Résistance in spite of the fact that the French were long gone, was the Hotel Juan-les-Pins.

Crawford and Abe Baker had radioed ahead and accommodations were ready for them. Their western clothing and other gear had been brought up from storage in the cellar.

At the desk, the clerk didn't blink at the Tuareg costume the two still wore. This was commonplace. He probably wouldn't have blinked had Isobel arrived in the costume of the Dogon. "Your suite is ready, Dr. Crawford," he said.

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The manager came up and shook hands with an old customer and Homer Crawford introduced him to Isobel, Jake and Cliff, requesting he do his best for them. He and Abe then made their excuses and headed for the paradise of hot water, towels, western drink and the other amenities of civilization.

On the way up in the elevator, Abe said happily, "Man, I can just *taste* that bath I'm going to take. Crazy!"

"Personally," Crawford said, trying to reflect some of the other's typically lighthearted enthusiasm, "I have in mind a few belts out of a bottle of stone-age cognac, then a steak yea big and a flock of French fries, followed by vanilla ice cream."

Abe's eyes went round. "Man, you mean we can't get a good dish of cous cous in this town?"

"Cous cous," Crawford said in agony.

Abe made his voice so soulful. "With a good dollop of rancid camel butter right on top."

Homer laughed as they reached their floor and started for the suite. "You make it sound so good, I almost believe you." Inside he said, "Dibbers on the first bath. How about phoning down for a bottle of Napoleon and some soda and ice? When it comes, just mix me one and bring it in, that hand you see emerging from the soap bubbles in that tub, will be mine."

"I hear and obey, O Bwana!" Abe said in a servile tone.

By the time they'd cleaned up and had eaten an enormous western style meal in the dining room of the Juan-les-Pins, it was well past the hour when they could have made contact with their Reunited Nations superiors. They had a couple of cognacs in the bar, then, whistling happily, Abe Baker went out on the town.

Homer Crawford looked up Isobel, Jake and Cliff who had, sure enough, found accommodations in the same hotel.

Isobel stepped back in mock surprise when she saw Crawford in western garb. "Heavens to Betsy," she said. "The man is absolutely extinguished in a double-breasted charcoal gray."

He tried a scowl and couldn't manage it. "The word is *distinguished,* not extinguished," he said. He looked down at the suit, critically. "You know, I feel uncomfortable. I wonder if I'll be able to sit down in a chair instead of squatting." He looked at her own evening frock. "Wow," he said.

Cliff Jackson said menacingly, "None of that stuff, Crawford. Isobel has already been asked for, let's have no wolfing around."

Isobel said tartly, "Asked for but she didn't answer the summons." She took Homer by the arm. "And I just adore extinguish—oops, I mean distinguished looking men."

They trooped laughingly into the hotel cocktail lounge.

The time passed pleasantly. Jake and Cliff were good men in a field close to Homer Crawford's heart. Isobel was possibly the most attrac-

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tive woman he'd ever met. They discussed in detail each other's work and all had stories of wonder to describe.

Crawford wondered vaguely if there was ever going to be a time, in this life of his, for a woman and all that one usually connects with womanhood. What was it Elmer Allen had said at the Timbuktu meeting? *". . . most of us will be kept busy the rest of our lives at this."*

In his present state of mind, it didn't seem too desirable a prospect. But there was no way out for such as Homer Crawford. What had Cliff Jackson said at the same meeting? *"We do what we must do."* Which, come to think of it, didn't jibe too well with Cliff's claim at Mopti to be in it solely for the job. Probably the man disguised his basic idealism under a cloak of cynicism; if so, he wouldn't be the first.

They said their goodnights early. All of them were used to Sahara hours. Up at dawn, to bed shortly after sunset; the desert has little fuel to waste on illumination.

In the suite again, Homer Crawford noted that Abe hadn't returned as yet. He snorted deprecation. The younger man would probably be out until dawn. Dakar had much to offer in the way of civilization's fleshpots.

He took up the bottle of cognac and poured himself a healthy shot, wishing that he'd remembered to pick up a paperback at the hotel's newsstand before coming to bed.

He swirled the expensive brandy in the glass and brought it to his nose to savor the bouquet.

But fifteen-year-old brandy from the cognac district of France should not boast a bouquet involving elements of bitter almonds. With an automatic startled gesture, Crawford jerked his face away from the glass.

He scowled down at it for a long moment, then took up the bottle and sniffed it. He wondered how a would-be murderer went about getting hold of cyanide in Dakar.

Homer Crawford phoned the desk and got the manager. Somebody had been in the suite during his absence. Was there any way of checking?

He didn't expect satisfaction and didn't receive any. The manager, after finding that nothing seemed to be missing, seemed to think that perhaps Dr. Crawford had made a mistake. Homer didn't bother to tell him about the poisoned brandy. He hung up, took the bottle into the bathroom and poured it away.

In the way of precautions, he checked the windows to see if there were any possibilities of entrance by an intruder, locked the door securely, put his handgun beneath his pillow and fell off to sleep. When and if Abe returned, he could bang on the door.

In the morning, clad in American business suits and frankly feeling a trifle uncomfortable in them, Homer Crawford and Abraham Baker presented themselves at the offices of the African Development Project, Sahara Division, of the Reunited Nations. Uncharacteristically, there was

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no waiting in anterooms, no dealing with subordinates. Dr. Crawford and his lieutenant were ushered directly to the office of Sven Zetterberg.

Upon their entrance the Swede came to his feet, shook hands abruptly with both of them and sat down again. He scowled at Abe and said to Homer in excellent English, "It was requested that your team remain in Mopti." Then he added, "Sit down, gentlemen."

They took chairs. Crawford said mildly, "Mr. Baker is my right-hand man. I assume he'd take over the team if anything happened to me." He added dryly, "Besides, there were a few things he felt he had to do about town."

Abe cleared his throat but remained silent.

Zetterberg continued to frown but evidently for a different reason now. He said. "There have been more complaints about your . . . ah . . . cavalier tactics."

Homer looked at him but said nothing.

Zetterberg said in irritation, "It becomes necessary to warn you almost every time you come in contact with this office, Dr. Crawford."

Homer said evenly, "My team and I work in the field Dr. Zetterberg. We have to think on our feet and usually come to decisions in split seconds. Sometimes our lives are at stake. We do what we think best under the conditions. At any time your office feels my efforts are misdirected, my resignation is available."

The Swede cleared his throat. "The Arab Union has made a full complaint in the Reunited Nations of a group of our men massacring thirty-five of their troopers."

Homer said, "They were well into the Ahaggar with a convoy of modern weapons, obviously meant for adherents of theirs. Given the opportunity, the Arab Union would take over North Africa."

"This is no reason to butcher thirty-five men."

"We were fired upon first," Crawford said.

"That is not the way they tell it. They claim you ambushed them."

Abe put in innocently, "How would the Arab Union know? We didn't leave any survivors."

Zetterberg glared at him. "It is not easy, Mr. Baker, for we who do the paper work involved in this operation, to account for the activities of you hair-trigger men in the field."

"We appreciate your difficulties," Homer said evenly. "But we can only continue to do what we think best on being confronted with an emergency."

The Swede drummed his fingers on the desk top. "Perhaps I should remind you that the policy of this project is to encourage amalgamation of the peoples of the area. Possibly, the Arab Union will prove to be the best force to accomplish such a union."

Abe grunted.

Homer Crawford was shaking his head. "You don't believe that Dr. Zetterberg, and I doubt if there are many non-Moslems who do. Mohammed sprung out of the deserts

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and his religion is one based on the surroundings, both physical and socio-economic."

Zetterberg grumbled, argumentatively, though his voice lacked conviction, "So did its two sister religions, Judaism and Christianity."

Crawford waggled a finger negatively. "Both of them adapted to changing times, with considerable success. Islam has remained the same and in all the world there is not one example of a highly developed socio-economic system in a Moslem country. The reason is that in your country, and mine, and in the other advanced countries of the West, we pay lip service to our religions, but we don't let them interfere with our day by day life. But the Moslem, like the rapidly disappearing ultra-orthodox Jews, lives his religion every day and by the rules set down by the Prophet fifteen centuries ago. Everything a Moslem does from the moment he gets up in the morning is all mapped out in the Koran. What fingers of the hand to eat with, what hand to break bread with—and so on and so forth. It can get ludicrous. You should see the bathroom of a wealthy Moslem in some modern city such as Tangier. Mohammed never dreamed of such institutions as toilet paper. His followers still obey the rules he set down as an alternative."

"What's your point?"

"That North Africa cannot be united under the banner of Islam if she is going to progress rapidly. If it ever unites, it will be in spite of local religions—Islam and pagan as well; they hold up the wheels of progress."

Zetterberg stared at him. The truth of the matter was that he agreed with the American and they both knew it.

He said, "This matter of physically assaulting and then arresting the chieftain"—he looked down at a paper on his desk—"of the Ouled Touameur clan of the Chaambra confederation, Abd-el-Kader. From your report, the man was evidently attempting to unify the tribes."

Crawford was shaking his head impatiently. "No. He didn't have the . . . dream. He was a raider, a racketeer, not a leader of purposeful men. Perhaps it's true that these people need a hero to act as a symbol for them, but he can't be such as Abd-el-Kader."

"I suppose you're right," the Swede said grudgingly. "See here, have you heard reports of a group of Cubans, in the Anglo-Egyptian Sudan to help with the new sugar refining there, being attacked?"

The eyes of both Crawford and Baker narrowed. There'd been talk about this at Timbuktu. "Only a few rumors," Crawford said.

The Swede drummed his desk with his nervous fingers. "The rumors are correct. The whole group was either killed or wounded." He said suddenly, "You had nothing to do with this, I suppose?"

Crawford held his palms up, in surprise, "My team has never been within a thousand miles of Khartoum."

Zetterberg said, "See here, we suspect the Cubans might have sup-

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ported Soviet Complex viewpoints."

Crawford shrugged, "I know nothing about them at all."

Zetterberg said, "Do you think this might be the work of El Hassan and his followers?"

Abe started to chuckle something, but Homer shook his head slightly in warning and said, "I don't know."

"How did that affair in Mopti turn out, these riots in favor of El Hassan?"

Homer Crawford shrugged. "Routine. Must have been as many as ten thousand of them at one point. We used standard tactics in gaining control and then dispersing them. I'll have a complete written report to you before the day is out."

Zetterberg said, "You've heard about this El Hassan before?"

"Quite a bit."

"From the rumors that have come into this office, he backs neither East nor West in international politics. He also seems to agree with your summation of the Islamic problem. He teaches separation of Church and State."

"They're the same thing in Moslem countries," Abe muttered.

Zetterberg tossed his bombshell out of a clear sky. "Dr. Crawford," he snapped, "in spite of the warnings we've had to issue to you repeatedly, you are admittedly our best man in the field. We're giving you a new assignment. Find this El Hassan and bring him here!"

Zetterberg leaned forward, an expression of somewhat anxious sincerity in his whole demeanor.

VIII

Abe Baker choked, and then suddenly laughed.

Sven Zetterberg stared at him. "What's so funny?"

"Well, nothing," Abe admitted. He looked to Homer Crawford.

Crawford said to the Swede carefully, "Why?"

Zetterberg said impatiently, "Isn't it obvious, after the conversation we've had here? Possibly this El Hassan is the man we're looking for. Perhaps this is the force that will bind North Africa together. Thus far, all we've heard about him has been rumor. We don't seem to be able to find anyone who has seen him, nor is the exact strength of his following known. We'd like to confer with him, before he gets any larger."

Crawford said carefully, "It's hard to track down a rumor."

"That's why we give the assignment to our best team in the field," the Swede told him. "You've got a roving commission. Find El Hassan and bring him here to Dakar."

Abe grinned and said, "Suppose he doesn't want to come?"

"Use any mthods you find necessary. If you need more manpower, let us know. But we must talk to El Hassan."

Homer said, still watching his words, "Why the urgency?"

The Reunited Nations official looked at him for a long moment, as though debating whether to let him in on higher policy. "Because, frank-

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ly, Dr. Crawford, the elements which first went together to produce the African Development Project, are, shall we say, becoming somewhat unstuck."

"The glue was never too strong," Abe muttered.

Zetterberg nodded. "The attempt to find competent, intelligent men to work for the project, who were at the same time altruistic and unaffected by personal or national interests, has always been a difficult one. If you don't mind my saying so, we Scandinavians, particularly those not affiliated with NATO come closest to filling the bill. We have no designs on Africa. It is unfortunae that we have practically no Negro citizens who could do field work."

"Are you suggesting other countries have designs on Africa?" Homer said.

For the first time the Swede laughed. A short, choppy laugh. "Are you suggesting they haven't? What was that convoy of the Arab Union bringing into the Sahara? Guns, with which to forward their cause of taking over all North Africa. What were those Cubans doing in Sudan, that someone else felt it necessary to assassinate them? What is the program of the Soviet Complex as it applies to this area, and how does it differ from that of the United States? And how do the ultimate programs of the British Commonwealth and the French Community differ from each other and from both the United States and Russia?"

"That's why we have a Reunited Nations," Crawford said calmly.

"Theoretically, yes. But it is coming apart at the seams. I sometimes wonder if an organization composed of a membership each with its own selfish needs can ever really unite in an altruistic task. Remember the early days when the Congo was first given her freedom? Supposedly the United Nations went in to help. Actually, each element in the United Nations had its own irons in the fire, and usually their desires differed."

The Swede shrugged hugely. "I don't know, but I am about convinced, and so are a good many other officers of this project, that unless we soon find a competent leader to act as a symbol around which all North Africans can unite, find such a man and back him, that all our work will crumble in this area under pressure from outside. That's why we want El Hassan."

Homer Crawford came to his feet, his face in a scowl. "I'll let you know by tomorrow, if I can take the assignment," he said.

"Why tomorrow?" the Swede demanded.

"There are some ramifications I have to consider."

"Very well," the Swede said stiffly. He came to his own feet and shook hands with them again. "Oh, there's just one other thing. This spontaneous meeting you held in Timbuktu with elements from various other organizations. How did it come out?"

Crawford was wary. "Very little result, actually."

Zetterberg chuckled. "As I expect-

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ed. However, we would appreciate it, doctor, if you and your team would refrain from such activities in the future. You are, after all, hired by the Reunited Nations and owe it all your time and allegiance. We have no desire to see you fritter away this time with religious fanatics and other crackpot groups."

"I see," Crawford said.

The other laughed cheerfully. "I'm sure you do, Dr. Crawford. A word to the wise."

They remained silent on the way back to the hotel.

In the lobby they ran into Isobel Cunningham.

Homer Crawford looked at her thoughtfully. He said, "We've got some thinking to do and some ideas to bat back and forth. I value your opinion and experience, Isobel, could you come up to the suite and sit in?"

She tilted her head, looked at him from the side of her eyes. "Something big has happened, hasn't it?"

"I suppose so. I don't know. We've got to make some decisions."

"Come on Isobel," Abe said. "You can give us the feminine viewpoint and all that jazz."

They started for the elevator and Isobel said to Abe, "If you'd just be consistent with that pseudo-beatnik chatter of yours, I wouldn't mind. But half the time you talk like an English lit major when you forget to put on your act."

"Man," Abe said to her, "maybe I was wrong inviting you to sit in on this bull session. I can see you're in a bad mood."

In the living room of the suite, Isobel took an easy-chair and Abe threw himself full length on his back on a couch. Homer Crawford paced the floor.

"Well?" Isobel said.

Crawford said abruptly, "Somebody tried to poison me last night. Got into this room somehow and put cyanide in a bottle of cognac Abe and I were drinking out of earlier in the evening."

Isabel stared at him. Her eyes went from him to Abe and back. "But . . . but, why?"

Crawford ran his hand back over his wiry hair in puzzlement. "I . . . I don't know. That's what's driving me batty. I can't figure out why anybody would want to kill me."

"I can," Abe said bluntly. "And that interview we just had with Sven Zetterberg just bears me out."

"Zetterberg," Isobel said, surprised. "Is he in Africa?"

Crawford nodded to her question but his eyes were on Abe.

Abe put his hands behind his head and said to the ceiling, "Zetterberg just gave Homer's team the assignment of bringing in El Hassan."

"El Hassan? But you boys told us all in Timbuktu that there was no El Hassan. You invented him and then the rest of us, more or less spontaneously, though unknowingly, took up the falsification and spread your work."

"That's right," Crawford said, still looking at Abe.

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"But didn't you tell Sven Zetterberg?" Isobel demanded. "He's too big a man to play jokes upon."

"No, I didn't and I'm not sure I know why."

"I know why," Abe said. He sat up suddenly and swung his feet around and to the floor.

The other two watched him, both frowning.

Abe said slowly, "Homer, you *are* El Hassan."

His chief scowled at him. "What is that supposed to mean?"

The younger man gestured impatiently. "Figure it out. Somebody else already has, the somebody who took a shot at you from that mosque. Look, put it all together and it makes sense.

"These North Africans aren't going to make it, not in the short period of time that we want them to, unless a leader appears on the scene. These people are just beginning to emerge from tribal society. In the tribes, people live by rituals and taboos, by traditions. But at the next step in the evolution of society they follow a Hero—and the traditions are thrown overboard. It's one step up the ladder of cultural evolution. Just for the record, the Heroes almost invariably get clobbered in the end, since a Hero must be perfect. Once he is found wanting in any respect, he's a false prophet, a cheat, and a new, perfect and faultless Hero must be found.

"O.K. At this stage we need a Hero to unite North Africa, but this time we need a real super-Hero. In this modern age, the old style one won't do. We need one with education, and altruism, one with the dream, as you call it. We need a man who has no affiliations, no preferences for Tuareg, Teda, Chaambra, Dogon, Moor or whatever. He's got to be truly neutral. O.K., you're it. You're an American Negro, educated, competent, widely experienced. You're a natural for the job. You speak Arabic, French, Tamaheq, Songhai and even Swahili."

Abe stopped momentarily and twisted his face in a grimace. "But there's one other thing that's possibly the most important of all. Homer, you're a born leader."

"Who *me?*" Crawford snorted. "I hate to be put in a position where I have to lead men, make decisions, that sort of thing.

"That's beside the point. There in Timbuktu you had them in the palm of your hand. All except one or two, like Doc Smythe and that missionary. And I have an idea even they'd come around. Everybody there felt it. They were in favor of anything you suggested. Isobel?"

She nodded, very seriously. "Yes. You have a personality that goes over, Homer. I think it would be a rare person who could conceive of you cheating, or misleading. You're so obviously sincere, competent and intelligent that it, well, *projects* itself. I noticed it even more in Mopti than Timbuktu. You had that city in your palm in a matter of a few hours."

Homer Crawford shifted his shoulders, uncomfortably.

Abe said, "You might dislike the job, but it's a job that needs doing."

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Crawford ran his hand around the back of his neck, uncomfortably. "You think such a project would get the support of the various teams and organizations working North Africa, eh?"

"Practically a hundred per cent. And even if some organizations or even countries, with their own row to hoe, tried to buck you, their individual members and teams would come over. Why? Because it makes sense."

Homer Crawford said worriedly, "Actually, I've realized this, partially subconsciously, for some time. But I didn't put myself in the role. I . . . I wish there really was an El Hassan. I'd throw my efforts behind him."

"There will be an El Hassan," Abe said definitely. "And you can be him."

Crawford stared at Abe, undecided.

Isobel said, suddenly, "I think Abe's right, Homer."

Abe seemed to switch the tempo of his talk. He said, "There's just one thing, Homer. It's a long range question, but it's an important one."

"Yes?"

"What're your politics?"

"My politics? I haven't any politics here in North Africa."

"I mean back home. I've never discussed politics with you, Homer, partly because I haven't wanted to reveal my own. But now the question comes up. What is your position, ultimately, speaking on a world-wide basis?"

Homer looked at him quizzically, trying to get at what was behind the other's words. "I don't belong to any political party," he said slowly.

Abe said evenly, "I do, Homer. I'm a Party member."

Crawford was beginning to get it. "If you mean do I ultimately support the program of the Soviet Complex, the answer is definitely no. Whether or not it's desirable for Russia or for China, is up to the Russians and Chinese to decide. But I don't believe it's desirable for such advanced countries as the United States and most of Western Europe. We've got large problems that need answering, but the commies don't supply the answers so far as I'm concerned."

"I see," Abe said. He was far, far different than the laughing, beatnik jabbering, youngster he had always seemed. "That's not so good."

"Why not?" Homer demanded. His eyes went to where Isobel sat, her face strained at all this, but he could read nothing in her expression, and she said nothing.

Abe said, "Because, admittedly, North Africa isn't ready for a communist program as yet. It's in too primitive a condition. However, it's progressing fast, fantastically fast, and the coming of El Hassan is going to speed things up still more."

Abe said deliberately, "Possibly twenty years from now the area *will* be ready for a communist program. And at that time we don't want somebody with El Hassan's power and prestige against us. We take the long view, Homer, and it dictates that El Hassan has to be secretly on the Party's side."

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Homer was nodding. "I see. So that's why you shot at me in Timbuktu."

Abe's eyes went wary. He said, "I didn't know you knew."

Crawford nodded. "It just came to me. It had to be you. Supposedly, you broke into the mosque from the back at the same moment I came in the front. Actually, you were already inside." Homer grunted. "Besides, it would have been awfully difficult for anyone else to have doped that bottle of cognac on me. What I couldn't understand, and still can't, was motive. We've been in the clutch together more than once, Abe."

"That's right, Homer, but there are some things so important that friendship goes by the board. I could see as far back as that meeting something that hadn't occurred to either you or the others. You were a born El Hassan. I figured it was necessary to get you out of the way and put one of our own—perhaps me, even—in your place. No ill feelings, Homer. In fact, now I've just given you your chance. You could come in with us—"

Even as he was speaking, his eyes moved in a way Homer Crawford recognized. He'd seen Abe Baker in action often enough. A gun flicked out of an under-the-arm holster, but Crawford moved in anticipation. The flat of his hand darted forward, chopped and the hand weapon was on the floor.

As Isobel screamed, Abe countered the attack. He reached forward in a jujitsu maneuver, grabbed a coat sleeve and a handful of suit coat. He twisted quickly, threw the other man over one hip and to the floor.

But Homer Crawford was already expertly rolling with the fall, rolling out to get a fresh start.

Abe Baker knew that in the long go, in spite of his somewhat greater heft, he wouldn't be able to take his former chief in the other man's own field. Now he threw himself on the other, on the floor. Legs and arms tangled in half realized, quickly defeated holds and maneuvers.

Abe called, "Quick, Isobel, the gun. Get the gun and cover him."

She shook her head, desperately. "Oh no. No!"

Abe bit out, his teeth grinding under the punishment he was taking, "That's an order, *Comrade Cuningham!* Get the gun!"

"No. No, I can't!" She turned and fled the room.

Abe muttered an obscenity, bridged and crabbed out of the desperate position he was in. And now his fingers were but a few inches from the weapon. He stretched.

Homer Crawford, heavy veins in his own forehead from his exertions, panted, "Abe, I can't let you get that gun. Call it quits."

"Can't, Homer," Abe gritted. His fingers were a few fractions of an inch from the weapon.

Crawford panted, "Abe, there's just one thing I can do. A karate blow. *I* can chop your windpipe with the side of my hand. Abe, if I do, only immediate surgery could save your—"

Abe's fingers closed about the gun and Crawford, calling on his last re-

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sources, lashed out. He could feel the cartilage collapse, a sound of air, for a moment, almost like a shriek filled the room.

The gun was meaningless now. Homer Crawford, his face agonized, was on his knees beside the other who was threshing on the floor. "Abe," he groaned. "You made me."

Abe Baker's face was quickly going ashen in his impossible quest for oxygen. For a last second there was a gleam in his eyes and his lips moved. Crawford bent down. He wasn't sure, but he thought that somehow the other found enough air to get out a last, "Crazy man."

When it was over, Homer Crawford stood again, and looked down at the body, his face expressionless.

From behind him a voice said, "So I got here too late."

Crawford turned. It was Elmer Allen, gun in hand.

Homer Crawford said dully, "What are you doing here?"

Elmer looked at the body, then back at his chief. "Bey figured out what must have happened at the mosque there in Timbuktu. We didn't know what might be motivating Abe, but we got here as quick as we could."

"He was a commie," Crawford said dully. "Evidently, the Party decided I stood in its way. Where are the others?"

"Scouring the town to find you."

Crawford said wearily, "Find the others and bring them here. We've got to get rid of poor Abe, there, and then I've got something to tell you."

"Very well, chief," Elmer said, hol-stering his gun. "Oh, just one thing before I go. You know that chap Rex Donaldson? Well, we had some discussion after you left. This'll probably surprise you Homer, but—hold onto your hat, as you Americans say—Donaldson thinks you ought to *become* El Hassan. And Bey, Kenny and I agree."

Crawford said, "We'll talk about it later, Elmer."

He knocked at her door and a moment later she came. She saw who it was, opened for him and returned to the room beyond. She had obviously been crying.

Homer Crawford said, but with no reproach in his voice, "You should have helped me, to be consistent."

"I knew you'd win."

"Nevertheless, once you'd switched sides, you should have attempted to help me. If you had, maybe Abe would still be alive."

She took a quick agonized breath, and sat down in one of the two chairs, her hands clasped tightly in her lap. She said, "I . . . . I've known Abe since my early teens."

He said nothing.

"In college, he was the cell leader. He enlisted me into the Party."

Crawford still didn't speak.

She said defiantly, "He was an idealist, Homer."

"I know that," Crawford said. "And along with it, he's saved my life on at least three different occasions in the past few years. He was a good man."

It was her turn to hold silence.

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Homer hit the palm of his left hand with the fist of his right. "That's what so many don't realize. They think this is all a kind of cowboys and Indians affair. The good guys and the bad guys fighting it out. And, of course, all the good guys are on our side and their side is composed of bad guys. They don't realize that many, even most, of the enemy are fighting for an ideal, too—and are willing to die for it, or do things sometimes even harder than dying."

He paced the floor for an agonized moment, before adding. "The fact that the ideal is a false one—or so, at least, is my opinion—is beside the point."

He suddenly dropped it and switched subjects. "This isn't as much a surprise to me as you possibly think, Isobel. There was only one way that episode in Timbuktu could have taken place. Abe was waiting for me to pass that mosque. But I had to pass. I had to be *fingered* as the old gangster expression had it. And you led me into the ambush."

He looked down at her. "But what changed his mind? Why did he offer, tonight, to let me take over the El Hassan leadership?"

Isobel said, her voice low. "In Timbuktu, when Abe saw the way things were going, he realized you'd have to be liquidated, otherwise El Hassan would be a leader the Party couldn't control. He tried to eliminate you, and then tried again with the cognac. Last night, however, he checked with local party leaders and they decided that he'd acted too precipitately. They suggested you be given the opportunity to line up with the Party."

"And if I didn't?" Homer said.

"Then you were to be liquidated."

"So the finger is still on me, eh?"

"Yes, you'll have to be careful."

He looked full into her face. "How do you stand now."

She returned his frank look. "I'm the first follower to dedicate her services to El Hassan."

"So you want to come along?"

"Yes," she said simply.

"And you remember what Abe said? That in the end the Hero invariably gets clobbered? Sooner or later, North Africa will outgrow the need for a Hero to follow and then . . . then El Hassan and his closest followers have a good chance of winding up before a firing squad."

"Yes, I know that."

Homer Crawford ran his hand back over his short hair, wearily. "O.K., Isobel. Your first instructions are to contact those two friends of yours, Jake Armstrong and Cliff Jackson. Try to convert them."

"What are you going to be doing . . . El Hassan?"

"I'm going over to the Reunited Nations to resign from the African Development Project. I have a sneaking suspicion that in the future they will not always be seeing eye to eye with El Hassan. Nor will the other organizations currently helping to advance Africa—whilst still at the same time keeping their own irons in the fire. Possibly the commies won't be the only ones in favor of liquidating El Hassan's assets." ■

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P. Schuyler Miller

FOR THE JUNIORS

Fantasy has a major role in children's stories, or used to before the psychologists became alarmed over what it was doing to the youngsters' sense of reality. With the exceptions that you find anywhere, my impression is that the children are better able to separate fantasy from reality than some of their elders, who govern their lives and their businesses by astrology or concentrate on secondhand "teachings" passed down by the people who run flying saucers.

There is, however, a general feeling that young people aren't being won over to science fiction as they once were: that rockets and space flight are "old stuff" now, relegated to the newspapers, and that the psychology and sociology that seem to have taken over in the magazines just aren't interesting—in fact, just aren't "science." Writers like Robert A. Heinlein and Andre Norton can still give us books—allegedly juveniles'—that are as good or better than most adult fare, but they are the exception. In any case, their books are directed at young people who consider themselves adult, whether the courts, the schools, and their parents do or not. Chances are they are also reading more adult books than their parents: more in the quantitative sense, and also more adult.

Down at the other end of the scale, in the elementary schools, a bridge is gradually being built between magic and science fiction. There are a good many fantasies—perhaps really not any more fantastic than some of the things we read regularly here in Analog—that involve people from other planets, and marvelous inventions, but they are intended as fantasy and, I think, recognized as such by everybody except, perhaps, some teachers. On the other hand, more and more "real" science fiction is also being written for the younger set—*not* just picked up from the adult magazines, like many teenage anthologies.

One of last year's best examples,

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Gordon R. Dickson's "Secret Under the Sea," was published by Holt, Rinehart and Winston for the eight to twelve set—price $2.95. This is the fourth book in a series that has included one about a ten-year-old stowaway, complete with pet frog, on the Moon, another about a twelve-year-old genius—sort of a junior, junior Tom Swift—and Robert Silverberg's "Lost Race of Mars," in which I feel that Bob wrote down too far and consequently didn't use his rare talents for color and action.

"Secret Under the Sea," on the other hand, has the strong plot and lively action that children love. It has a hero with whom they can identify in Robby Hoenig, with a strange and wonderful pet, Balthasar the dolphin, who comes straight out of the up-to-the-minute experiments with the intelligence of these strange mammals. It shows a marvelous undersea world, and its plot grows out of that world and conditions there. In short, it's rarely good science fiction written for the grade-school set—and *not* written down.

For children of the same age, or a little older, is a paperback by a Pittsburgh area teacher, published by a local press: "The Starfire," by Kenneth Eager; Boxwood Press, Pittsburgh; 174 pp.; $1.95. This was written in 1954 as a play, then turned into a narrative and "field tested" in the elementary and junior high schools of Monroeville, one of the faster-growing Pittsburgh suburbs. Apparently the kids loved it, for here it is in an IBM-typed edition. The dialog is excellent, but by our standards the book is closer to fantasy than science fiction, for the author wants you to believe that a brilliant twelve-year-old has built a moon-rocket and a matter transmitter, without adult knowledge, and is able to take off with his brother and the girl next door on a jaunt that takes them to assorted planets. Here the flow of incident and the reality of Bobby and the pestiferous Mary Ruth carry the story past some undigested text-book science that doesn't always hold water. With some digested science, this author can do a real job in the juvenile science-fiction field.

The pretty young come into their own in "Threshold of the Stars" by a French author, Paul Berna, for whom it earned the 1955 Grand Prix Littéraire du Salon de l'Enfance—an award made by a jury of young people. It's an Abelard-Schuman book; 176 pp.; $3.00, and it's to be

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hoped that the sequel, "Continent to the Sky," will follow—for here is an especially good piece of writing. The story is told, years later, by Michael Jousse, who in the 1970s was one of a group of children whose parents worked in a secret French space-flight base. They are constantly trying to see things they are not supposed to see, becoming involved with spies and saboteurs, and yearning for the day when they, too, can go to the Moon in one of the strange globe-ships. There is, perhaps, a little too much "scientific" double-talk to make the book as good science fiction as it is good writing; the Moon is to be given an atmosphere, by a similar but slightly more plausible process than is used in Paul Tabori's recent "Green Rain." The children do the things children have always wanted to do, see both villainy and heroism magnified, and are about as real a batch of brats as have crossed the Atlantic.

Veteran writer-anthologist-editor-fan Donald A. Wollheim has his best work by far in a new series he is writing for Doubleday, the "Mike Mars" series, at $1.25 apiece. The first four volumes are out, and form a kind of unit in that a running feud with a thoroughgoing villain is cleaned up in the fourth book. Wollheim has an excellent gimmick, and has made the most of it: he supposes that NASA has set up a secret parallel to Project Mercury, in which a group of fresh Air Force Academy graduates get the same space-training program that Mercury is giving to experienced pilots. Mike Mars is actually Lieutenant M.A.R. Samson; his closest pal is a young Cheyenne Indian, Johnny Bluehawk; and the opposition is provided by a classmate, Rod Harger, whose tycoon father will stop at nothing—including sabotage and murder—to see that his son and he reap the financial rewards coming to the first man in space.

The training program develops gradually from "Mike Mars, Astronaut" through "Mike Mars Flies the X-15" to "Mike Mars at Cape Canaveral" and finally—a step ahead of Mercury—to "Mike Mars in Orbit." The author has visited the various training centers for the Mercury program, so that his "Project Quicksilver" is authentic in every detail—and shows it. The villainy is on about the level of what I remember of the original "Tom Swift"—simple, straightforward, and believable. NASA and our heroes do seem a bit stupid, in not taking better precautions to ward off the trouble that is dogging them, but they're no worse in that respect than the heroine and police in a typical adult "had-I-but-known" detective story. However, the background is what is outstanding about the series. Donald Wollheim's big challenge is coming up with the next books in the series, when he has to go beyond Mercury—as he already has, by putting Mike Mars into orbit in the last book, and making him carry out repairs in space—and take Mike Mars and his friends to the Moon and Mars.

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Another more leisurely series by an English writer, Hugh Walters, reached its third book last year and may be into the fourth by the time you read this. "First on the Moon" —Criterion Books; 192 pp.; $3.50— takes the hero of "Blast off at 0300" and "Menace from the Moon," young Chris Godfrey, to the Moon itself in a race with a Russian of equal youth. They are both trying to discover the secret of the mysterious domes near Pico, from which the Earth was rayed in the previous books. The Russian has also had impressed on him the importance of being the only one to get back—but this kind of villainy defeats itself in the end, setting the stage for another book in which only the mysterious aliens are the villains. The author has a son in the RAF, but if he has had official help in depicting the British space program, as Donald Wollheim had with "Mike Mars," it isn't mentioned, nor is it especially evident. This series becomes more and more routine and really juvenile as it goes along.

Finally, that veteran of this and other magazines H. Beam Piper, has done an original teen-ager, "Four-Day Planet" for G. P. Putnam's Sons—221 pp., $3.50, and good. There is no writing down here: the grim world of Fenris is as fully and realistically portrayed as it would be for a story here in Analog. The contorted frontier society, dependent on a rare wax obtained by harpooning sea monsters and hard-ridden by a racketeer and crooked labor leader, is as solidly worked out as you could ask. The action, on land and sea, grows out of the setting and situation, and is as full of mystery and violence as you could wish.

Here, I think, is the secret of the difference between *real* science fiction, as presented by Dickson, Wollheim, Piper, and to a degree Berna, of the writers we have just discussed, and some of the other books appearing as science fiction for juveniles. The good writers adhere to the same basic discipline that they do in their adult books and stories: the plot complications grow out of the world or society or situation they are using, whereas in the "pseudo-SF" the other-world settings are simply sets, and the action could take place anywhere at all. Even with Berna, whose wonders take place pretty much off-stage, I think the rule holds, for only children cooped up behind the fences of a secret scientific project such as his would have the pressures and temptations that his youngsters do. Maybe the "Mike Mars" series could be written about a bunch of young men training for the Hambletonian, and the villain could roll rocks on their sulkies or poison their horses, but I doubt it.

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STRANGER IN A STRANGE LAND, by Robert A. Heinlein. G. P. Putnam's Sons, New York. 1961. 408 pp. $4.50

This is Robert Heinlein's most ambitious novel, but not one of his best. It contains his best and most interest-

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ing character, but its hero never comes to life. It should be by far his most controversial book, but it probably won't be.

Now to justify these paradoxes, in reverse order.

"Stranger in a Strange Land" is built around a series of themes that are, or have been, unorthodox in science fiction and in "normal" society. Its nominal hero is Valentine Michael Smith, born of man and woman but brought up on Mars, by the nonhuman Martians, with no knowledge of his own race, its powers and limitations, or the society which is its most complex artifact. Since nobody realized he should not have them, he has developed psi powers not possessed by most other human beings. He thinks like a Martian, acts like a Martian, and in all but bodily form is a Martian. When he is brought back to Earth—where he also has unexpected economic and political powers—his adjustment to human society is at first very slow, then explosive. In the end, humanity adjusts to *him*. This is an X ray of the skeleton of a full-fleshed and complicated plot.

The Martians go through a multi-stage development—larva to nymph to imago, ending with the immortal Old Ones who are the disembodied souls of all the Martians who have ever lived, and who run their planet and their people with a strong hand. To Mike Smith, they are as real as the bodied creatures that other people can see, and when he comes to Earth he is continually expecting to be introduced to the Old Ones of this planet. What's more, they are there—we eventually see them in action. Survival of the soul is not part of the structure of a typical science-fiction story, let alone one of Heinlein's.

We are shown an evangelistic religion which has brought into play just about every technique of carnival and sidewalk peddling, organized crime and power politics, that can be imagined. Its strong-arm squads smash down any opposition. Its temples are filled with slot machines and even less subtle devices for parting the pilgrim from his belongings. There is a clear implication that worthy followers who have been persuaded to will their estates to the Church are efficiently murdered. And in the end Michael Smith turns evangelist himself and builds a new church on the foundation of the old, adding the off-hand miracles that his psi powers make possible, and adding also a structure of sexuality that is his real "contribution" to civilization.

Now, all this violates enough taboos and breaks enough precedents so that fandom and the professional science-fiction world should both be abuzz and agog over the book, as they were over "Starship Troopers." I hope they are, but I don't think they will be, and for a reason that will be discouraging to some. I simply don't think enough people care enough about the fact or fantasy of survival, the bases and teachings of religion, or the code of sexual morality for these things to disturb them. They did care, on the other hand, about a philosophy that seemed to say that war

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and military service should be the foundations for civilization.

Heinlein has created one lively, continually interesting, dominant character in "Stranger in a Strange World," but it is not Michael Smith, the Man from Mars. It is Jubal E. Harshaw, LL.B., M.D., Sc.D., "bon vivant, gourmet, sybarite, popular author extraordinary, and neo-pessimist philosopher," who has a palatial estate in the Poconos, three gorgeous resident secretaries, and all manner of past and present connections with the outside world. Jubal Harshaw is a scene stealer and a scenery chewer; he dominates every scene in which he has a part, and many in which he is in the wings. He comes into the book on page 81, following a very slow start, and immediately takes over. If any part of the novel could be serialized, I should say it would be the next hundred and thirty or so pages, in which Jubal—to whom Michael Smith has been brought by a nurse, who has snaked him out from under government guards—takes on the whole majesty and potency of said Government, and leaves it limp.

None of this is accident; Robert Heinlein doesn't waste this kind of build-up. In the end we learn that Jubal has created in himself those qualities and relationships which Michael Smith sees as the real purpose and heritage of humanity, and which he hopes to develop through his cult. Unfortunately, this phase of Jubal's personality never really comes into focus. We can't believe very strongly in Mike, or in his Martian-born philosophy, or—consequently—in what it reveals about Jubal Harshaw, or about mankind.

Because I think it is self-evident that "Stranger in a Strange Land" is intended to say something about mankind. It is truly a novel, not just an entertainment—just a story. In saying this, I suppose I am on the verge of reversing everything I said about "Starship Troopers" and the folly of assuming that the society an author creates is the society he wants for the world. However, I am not going to let my Wiswell syndrome get the better of me, because I think Heinlein is doing something more subtle here. He is building a world and a story around one law or principle of a science or pseudo-science—psychology—that science fiction has pretty well neglected. The Man from Mars discovers in his own young, undeveloped race a potential and source of energies that the Martians do not have—the bisexual energy that, to one school of psychology at least, powers all human accomplishment. Mike Smith's so-called sex cult is simply the conscious utilization and control of these inherent energies—quite on a par with using and controlling water power, or steam, or electricity, or nuclear fission and fusion.

There is a pertinent sentence in an interesting letter from John W. Aldridge of Hollins College in the September *Playboy* that sums this up: "The problem . . . is not how to make sex interesting *in* literature, but how to make it interesting *as* literature." This is what Robert Hein-

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lein has tried to do in "Stranger in a Strange World," with only partial success. He has advanced his theme and argued it on an intellectual level, but never really "sold" it by making the reader *experience* its truth and reality. If he had done so, I suppose the book would be sold under the counter as a new masterpiece of pornography, and the intellectual point would be lost.

There is too much in the book to suggest more than a fraction of its richness. The picture of the Fosterite Church of the New Revelation is devastating satire—yet we meet Foster, and the structure he has built is the foundation of Mike Smith's cult of new, new revelation. There is another gem of a sequence showing the operation of astrology in a nonrational society which has almost returned to some attitudes of the Middle Ages. There are other grand minor characters—the tattooed Fosterite woman, Patty, and the semantician of the ship that discovers Michael, Dr. Mahmoud. There is the slowly unfolding concept of *grokking*, and the other of water-brotherhood . . .

Every Heinlein book is put together like a master-structure of dry-laid masonry—like one of the cliff-palaces that the early Pueblo Indians erected in the canyons of the Southwest—with everything fitting everything else, everything serving a purpose, down to the last spall of stone chinked into a crevice. This time the overall structure is harder to comprehend than usual, and some of the pieces tend to crumble under study.

THE LOVERS, by Philip José Farmer. Ballantine Books, New York. No. 507-K. 1961. 160 pp. 35¢

In the summer of 1952, just as I was packing to move to Pittsburgh, Philip José Farmer's "The Lovers" was published in *Startling Stories*. The original novelette was probably the most talked-about story of the year; if there had been Hugo's then, it would surely have won one. Now, expanded into a novel, it gets another chance, and if it should be the winner for 1961, the award will mean more than it would have ten years ago.

"The Lovers" earned its original notoriety for two reasons. First, and perhaps foremost, it was a science-fiction story in which sexual relations played the central part. Second, there was a potent sexual gimmick that I don't feel able to reveal even now. Old fans know what it is, but a new generation is entitled to that last slug in the wind.

Now Mr. Farmer has strengthened his story by building up the structure of the Sigmen society of 3050 A.D., which is also the setting of his recently published "A Woman a Day." The latter book, as various readers have pointed out, is an expansion of his follow-up to "The Lovers," originally published as "Moth and Rust," and dates from some three hundred years earlier.

This portrait of a warped, puritanical, hierarchial social order is a major achievement of science fiction. The world of these two books is more intensely realized than Robert A. Heinlein's "Future History"; it is almost as real—cruelly real—as the world of

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Orwell's "1984." It goes without saying that we can see the insanities and perversions of our own time distortedly mirrored in this world that Sigmen made and left to fester, for that is the mode and purpose of apocalyptic science fiction. It also follows—since this appears to be the author's crusade—that the illogic and hypocrisy of our own sexual code is exaggerated to the point where the hero, Hal Yarrow, is walled off from any kind of normal relations—by Twentieth Century standards, at least—with his wife or any other woman. Taboos, prohibitions, rituals—this is as hag-haunted a future as anyone has shown us.

Then, on a distant planet whose intelligent arthropods are to be destroyed to provide *lebensraum* for the Sigmen world, Yarrow comes up hard and suddenly against a woman who knows nothing about the kind of conditioning he has had. Little by little the barriers are broken down, little by little Yarrow becomes more human—and then the sky falls.

It's a *tour de force,* it's a landmark, and it's only the beginning of what Farmer can and probably will do. It's too bad that the book is published only as a paperback.

» » »

MORE STORIES FROM THE TWILIGHT ZONE, by Rod Serling. Bantam Books No. A-2227. 1961. 149 pp. 35¢

I don't know whether Rod Serling wrote these seven short stories from the scripts of his television series, or the scripts from the stories. Nor do I think they are quite up to his first collection.

The mixture is as before: some science fiction, some supernatural fantasy, some "straight" with an ironic ending. "The Lonely" which opens the book, is perhaps the best: the story of a convict, marooned on an asteroid, who is brought a female android as a companion . . . and then is pardoned. "The Odyssey of Flight 33" used gobbledegook to "explain" why a jet flight, passing the "sound barrier," should go backward in time to the Mesozoic and find dinosaurs at Idlewild. In "A Thing About Machines," Mr. Finchley is hunted to his death by the machines that he hates. As you can see, these verge on fantasy.

Openly in that form we have "Mr. Dingle, the Strong," temporarily a superman by grace of a miracle passed by visiting ET's. For sheer emotional power, there is "The Big, Tall Wish," in which a child's wish makes a has-been fighter seem to win—sentimental, yes, but carrying conviction. "A Stop at Willoughby" is the rather routine one about the little town seen from a train window, where everything will be all right. Finally, "Dust" need not be a fantasy at all—simply a story of ironic fate in a small western town.

"Twilight Zone" won the "Hugo" award for the best dramatic fantasy-SF program of 1959; and it's a contender in 1960. It just may win again. The quality of these stories, rather than their originality, shows why. (It did win in 1960, too! Ed.)

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REPRINT SHELF

THE CHALLENGE OF THE SPACESHIP, by Arthur C. Clarke. Ballantine Books, No. F-528. 189 pp. 50¢

The collection of Clarke's speculative articles, from divers sources, that Harpers published in 1959. New preface and a new autobiographical sketch.

» » »

6 x H, by Robert A. Heinlein. Pyramid Books, No. G-642. 191 pp. 35¢

Published by Gnome Press as "The Unpleasant Profession of Jonathan Hoag"; a collection of long and short fantasies, including the classics "Our Fair City" and "And He Built a Crooked House."

» » »

THE GREEN PLANET, by J. Hunter Holly. Monarch Books No. 213. 143 pp. 35¢

The author—who turns out to be *Miss* Holly, Michigan State '54—produced one of Avalon's better titles when the hard-cover edition came out in '60. Exiles fight for life on a planet of man-eating birds and strange natives.

» » »

SIN IN SPACE, by Cyril Judd. Beacon Books No. 312. 190 pp. 35¢

To quote the copyright page, "a version of this story was formerly published under the title 'Mars Child.'" This is another in the sexed up reprint series allegedly sponsored by *Galaxy*—which doesn't advertise 'em.

» » »

STORM OVER WARLOCK, by Andre Norton. Ace Books No. F-109. 192 pp. 40¢

Ace is performing a major service by reprinting these so-called juveniles by Andre Norton, who writes some of the best color-and-actions yarns you'll see anywhere. If your status syndrome wouldn't let you read the hard-back edition, no stigma is attached to the p-b.

» » »

1984, by George Orwell. Signet Books CP-100. 267 pp. 60¢

A "Signet Classic," with an analysis by the psychologist Erich Fromm.

» » »

LEVEL 7, by Mordecai Roshwald. Signet Books No. D-1956. 143 pp. 50¢

A diary of the last years of humanity, seen from the vantage point of Level 7, where a cynical bureaucracy hopes to last out the next war.

» » »

THE BIRD OF TIME, by Wallace West. Ace Books No. F-114. 224 pp. 40¢

Seems I liked this entertaining yarn when Avalon published the hardcover edition, and say so on the back of the p-b. Behind that are bits published here in 1936, and in *Thrilling Wonder* between 1949 and 1953.

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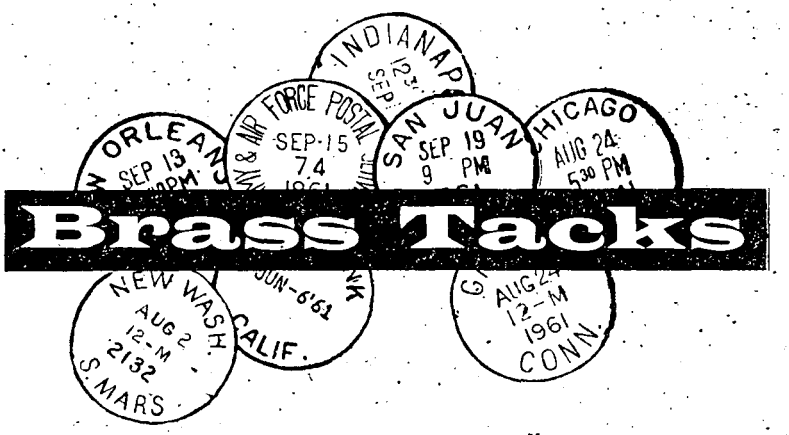

Dear Mr. Campbell:

I have just read the "Pie in the Sky" editorial and recently reread Heinlein's "Requiem." There must be a middle ground between the fantastic public and government lack of enthusiasm and even good sense on one hand and the occasional sometimes overpowering individual drive to "do something" on the other.

I want this letter published to ask of the individuals—those left in this country—how many *want* to ride the spacecraft when they are built? How many would have liked to ride with Commander Shepard or Major Gagarin. *FURTHER* how many of these are influential or high ranking and won't admit their desires in public. I would give a year's salary to be on any such trip or subsequent one. YES, if the first commercial space vessel is Russian—and it probably will be—I will go through whatever red tape or expense is necessary to get "out there" on board same.

Somebody, J.W.C., or the S.F. fans tell me, *tell us* how the ones who want to feel the drive and fall of a ship and see the splendor of space can pool our money, talents, and voices. How can we dispel the apathy and the submergence in "sophisticated little" experiments and get us on the true road to space.—Peter Lefferts, Pres. Electro-Audio Research, 67 Randall Road, Princeton, New Jersey

Perhaps the best answer is—"Get your neighbors interested!"

» » »

Dear Mr. Campbell:

I enjoy your editorials despite the fact that I frequently disagree with your conclusions.

Here, I'm about to sound off on your "Pie in the Sky."

When *Sputnik I* first made its appearance, I found myself reacting like yourself, only more so. That the USSR should have beaten us to so important a first, I took as a personal affront.

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Shortly thereafter, I joined the American Rocket Society if only to feel that I was making some contribution to The Effort.

I certainly agree with your espousal of private industry.

I disagree with your contention that the American Public wants no part of space. Their attempts to minimize Soviet space achievements—the painful attempts at believing that Russia's Far Side moon pictures—and Gagarin's orbital flight were frauds—are conclusive proof that they care very, very much indeed about Space, and especially American prestige in Space. Wishful thinking has prompted our jeers, plus Operation National Neurosis—tendency to avoid looking unpleasant facts squarely in the face.

Rather, I think the real fault lies in American Youth, especially male youths. Few are really athletic. Most have soft, poorly developed muscles —except finger muscles that actuate push-buttons, and foot muscles that depress gas & brake pedals. Yes, I am very much afraid that Schmalz—soft fat—already a national disgrace threatens to become a calamity. Eschewing the Strenuous Life, we are pursuing power brakes, power steering, power windows, power mowers, automatic chokes, automatic lights for amperes and oil pressure, automatic iris diaphragms, and anything, in fact, to avoid physical effort. And now devices to teach us while we sleep—avoidance of mental effort.

Are we running out of guts?

Self-discipline—is this now considered unnecessary? I haven't heard about it in a long time.

Satisfaction from a job well-done —is this to be found only among fossil remains?

I guess I sound old. But I don't feel old. I still enjoy a good fight—I guess that's why I enjoy reading your editorial-articles—you seem to be the perennial rebel yourself.

I see that you agree with the president of the ARS—about the necessity of our developing our solid-fuel rockets. Here's hoping you guys can reach someone high up with some real get-it-done-ability!—Philip Mayer, 566 Middle Neck Road, Great Neck, Long Island, New York.

The average American doesn't want Space—he wants the Prestige of conquering space, without the work and risk of doing it. The Prestige he cares about—the status—not the reality.

» » »

Dear Mr. Campbell:

These are a few notes on your "Constitution for Utopia," but before I begin, I want to congratulate you on the devastating way in which you handled the people who consider wealth to be morally wrong. Do they consider that America being the wealthiest nation of Earth proves that America is "selfish, greedy and not given to the general welfare" I wonder?

However, having said that, I think that the idea is wrong because it is based on false assumptions. Firstly,

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while it is general that societies reward good work and intelligence by money, it is not invariable. The Greeks loved money more than most—in fact they invented it—but during their greatest period, the people who had most influence, and were most highly regarded, were often very poor. One can well postulate a society in which the highest rates of pay go to the most menial jobs—because that is the only way to get them done.

Secondly, I dispute the value of the restricted franchise. Your theory of "Immunity and Power" or, as you put it in another Editorial, "Responsibility and Authority," is very sound. But, in fact, a restricted franchise has always been compelled to expand, or, has gone down in bloody revolution. The only stable restrictive franchise is absolute despotism. (The English Aristocratic system broke down, not because it was not good, but because a numerous and powerful class of *nouveau riche* wanted in on the Government. The alternatives were, enlarge the franchise or Civil War.)

If you must have a restricted franchise, then Heinlein's is the only one likely to work, because, as he points out, if the franchise is limited to the wolves, how can the sheep rebel? Contrary to your Editorial such a system has never been tried. There have been systems in which military service is a condition of Citizenship, but the service was always such that the overwhelming majority could do it. Heinlein's idea of making the Service so tough that only the most determined can take it, is something else.

To be constructive. There is a facet of the English system you missed, and to my mind it is the most important. That is the existence of a system designed to produce in the most intelligent boys in the country a dedication to the Public Service. (That, incidentally, is why they are called Public Schools.) It is further necessary, but English snobbery takes care of that, that all other schools should imitate the Public School as much as possible. Consequently, every citizen is exposed to the idea of Public Service in his youth, and experiences both subordination and authority.

This brings us back to the question "how do you select the best?" The English system is primarily by competitive examination—with all its faults AND ALL ITS VIRTUES. BUT, provided they pass minimum standards, there are places reserved for children whose parents can pay high fees, and for children of alumni at reduced, or even no, fees. The schools tend to specialize, thus one concentrates on producing doctors, one diplomats, several civil servants and statesmen. Families go to the same school for generations. Consequently, there is a tremendous pressure on Higher Public Servants to do their best. There is always an old schoolmate in the next office, on the next battalion—the people whose regard one cares for most, are all about one all one's life.

That is not to say that only public school boys can reach the top. Far from it. The majority of senior public servants come from grammar schools

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—a sort of second class, day-boys only, but still very high grade public school—while the majority of junior public servants come from ordinary schools and there are always some, at the very top, from all kinds of schools. But all have had the indoctrination for Public Service.

To my mind, the details of the Constitution are unimportant except that they should be few. Good men will make any Constitution work well, and bad men will make any one work ill. In broad outline I would advocate a limited, hereditary monarchy, in which the monarch has certain power at the highest level, but in which ultimate authority AND responsibility lies with the Lower, elected House. (Your Presidential veto that can be overruled by a two thirds majority is an example). The elected House should have sole control over money, but in other matters, should be equal with an appointed Upper House. The advantages of an hereditary monarch and an appointed House in checking the excesses of an elected House are obvious—so are its dangers. To avoid these, I would suggest that the method of, and qualifications for, appointment to the Upper House should be altered by the Elected House every fifty years.

Further, the monarch should end his reign by abdication before he begins to slip. There should be some method—e.g. a two thirds vote of both Houses sitting independently—whereby such an abdication could be forced, if necessary.

The most important thing, however, is an educational system in which all children are taught: a. The necessity of thinking; b. How to do it, and c. The Glory of Public Service. (*This is where your point about the* importance of Latin and Science in teaching clear thinking comes in). To avoid the obvious dangers of State control, I recommend the independence of each school, or at least of small groups of schools. In Britain, all public and most grammar schools are controlled financially by a Board of Trustees—mostly Alumni—and academically by the teachers. The only outside control is the sanitary inspector, and the necessity of passing exams set by outside bodies. Even the State schools are controlled by local authorities. Except for London (8,000,000) and Glasgow (2,500,000) few authorities have over a million population, and some only 100,000. It would be better to have all schools completely independent.

In summary, my contribution to your Constitution for Utopia is—to ensure an Educational system that will teach the children that Public Service is the most important duty and highest calling open to man. And one which will also teach them to think for themselves—logically.

Secondly, I advocate some form of limited monarchy.—Harold T. Kay, 22 Sunset Boulevard, Ottawa, Ontario, Canada.

If you look carefully—the original unamended United States constitution did call for one elected and one appointed house!

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«Continued from page 82»
stared hard at the doctor. "Perhaps Whylan did contact you, but, if he did, you were only too willing to help. Due to the assassination of several high officers things are in a state of flux and an ambitious man, guided by Ludec, could reach great heights. Is that why he came here alone?"

"Yes, but—"

"But, of course, knowing that Ewart had made plans of his own you were thinking only of the good of the Federation. Is that it?"

Johns nodded, he was sweating.

"You are, naturally, not to blame for Whylan's defalcation," said Leaver smoothly. "However, you can see how important it is that Ludec be immediately removed to a place of greater safety. I need hardly remind you that only the fullest co-operation at this stage will enable me to speak on your behalf at a later date." He seemed to have forgotten the pistol in his hand. "Now take me to Ludec."

"That," said Ewart, "will not be necessary."

The examiner stood just within the door, his hands open and held before him. He was unarmed—it was the only thing which saved his life. Leaver stepped back to give himself a wider field of fire, cursing himself for his own incompetence. He should have used greater care. He had concentrated too much on one man; using words when he should have used action.

It was small consolation to know that, even now, he held the whip hand.

"The door registers in my office," said the examiner. "I should explain that I am in command here. The entire building is, naturally, wired for sight and sound." He glanced at the doctor. "Johns should have remembered that."

"I had to play for time," stammered the doctor. "He shot down Whylan as if he had been an animal. There was nothing else I could do."

"Nor I—until Whylan arrived." Ewart stepped forward towards the body. He looked at Leaver. "I take it that you are an agent of the Terran League?"

"Are you insane?"

"You are reluctant to admit it, naturally." Ewart shrugged. "But there comes a time when pretense is a positive danger. I take it that you have come for Professor Ludec?"

"Yes."

"A remarkable man, the professor. A genius, there is no other word to describe him. We have had long conversations, he and I. I shall miss him."

Leaver shook his head. He had the feeling that things were getting beyond his control. Ewart glanced down at Whylan's body.

"I am going to stoop and pick up that pistol," he said. "I tell you this because I do not want you to shoot me. I intend you no harm—on the contrary, but it is a thing I must do. I might also add that I am the only man who is able to operate the lock on Ludec's cell. I suggest you bear that in mind."

Before Leaver could answer Ewart

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had stooped, picked up the pistol—and shot Johns. The clatter of the falling weapon merged with the sound of the doctor's fall. Calmly the examiner looked at the other man. Leaver eased his finger.

"Shall we go?"

Ludec looked, thought Leaver, something like a fish. Or, rather, like a hairless monkey. Then anger rose as he looked at the small, somehow pathetic figure huddled in the cell.

"Professor!"

Ludec looked up, blinking his eyes in the dim lighting. He swallowed and climbed to his feet. Leaver, stripping the cloak from his shoulders, wrapped it around the old man.

"Thank you."

"How are you, professor? Are you fit enough to travel?"

"I shall be all right." Ludec closed his eyes and swayed a little. "Are you from the League?"

"Yes."

Ludec nodded and then, suddenly, tears began to course down his cheeks. He gulped.

"I am sorry . . . this weakness . . . it—"

"Forget it!" Anger rose within the Special Agent. "That Ewart, the boss of this place, do you want me to kill him?"

"No!" Ludec shook his head. "No, you mustn't do that." He glanced to where the examiner stood against the wall, his face impassive. Leaver grunted.

"He deserves it. I've just seen him shoot down a man in cold blood he—" He broke off. Within his ear a tiny voice was yelling with undisguised urgency.

"Leaver! Get a move on! Three military type flitcopters loaded with men!"

"Coming!" Leaver spoke aloud. "We've got to get moving, professor. It's no time to be queasy." He raised his gun.

"No!" Ludec grabbed his arm. "Lock him in this cell. Hurry, I'll explain later."

Leaver hesitated, then slammed the door on the unresisting examiner. Together he and the old man ran through the building which, apparently, was deserted. At the main door he fumbled with the operating mechanism, Changa's voice in his ear.

"Run man or you've had it! Run!"

"How bad?" Leaver tensed as the door mechanism began to hiss.

"About thirty men advancing on the building. Where are you?"

"At the door."

"Head left as you come out. Hug the wall as you run. Got Ludec?"

"Yes."

"Make it fast, Leaver." Changa was urgent. "Now?"

"Now!"

The door opened. Leaver stooped, swung Ludec up in his arms and, ducking low, raced from the building. He kept the wall to his left and concentrated on nothing but speed. To his right, where the troops were advancing, he heard a shout which abruptly dissolved into a gurgle. Changa verified his suspicions.

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"I'm covering you. Too many for a wipe-out but I'll do my best."

"Watch yourself!"

Bushes whipped around his legs and something cut the grass inches from his feet. Ludec seemed to weigh a ton and the ground had turned into glue. But no more shots came his way, the troops were too busy fighting the invisible death aimed by an invisible marksman.

Leaver blundered among trees, staggered, oriented himself and plunged on. Something dark loomed before him.

"Made it!" He set Ludec on his feet and fought for breath as he spoke to Changa. "Pull out and join us."

"No soap." A wracking explosion ripped the night with fire and fury. "They've got me bracketed, probably with peep-screens and dark lights. Well, it was fun while it lasted."

"Pull out man, you're not dead yet."

"Get on your way," snapped Changa. "Give my regards to Radford. I—"

His voice broke, snapped, died in Leaver's ear. He felt an emotional shock as if almost a part of him had died. Communication by subradio was more than just words. There was more than that, the very vibration of life itself and, when it died, it was more than silence.

Deep in the undergrowth a red fury sprang into being. A current had ceased to flow in a once-living brain. An organic trigger had closed and tiny capsules of energy had vented their fury. Changa had provided his own cremation. There would be no evidence for anyone to find.

Tired Leaver helped Ludec into the flitcopter.

The journey had its moments. There was a time when they had to land and hide while rotors droned above but they were normal hazards which Leaver took in his stride. As dawn broke Ludec wakened from his sleep and they had a chance to talk.

"Where are we going?"

"To a spot where Ross will send down a pick-up ferry to lift us to safety." Leaver stretched and fought his tiredness. Aside from the death of Changa it had been a successful operation, but he wished that he had killed Ewart. He said so. Ludec shook his head.

"No, he had to live, I wanted him to."

"Uh?"

"You see, he came to me. He was, not afraid, for fear is a term hard to apply to a man like Ewart, but perturbed. He had made an enemy, and he knew the consequences of failure. I had offered to help him and he wanted to take advantage of my offer. It was a simple thing to introduce the concept of supreme leadership to a man of his nature."

"He's a murdering swine!"

"He killed Johns, but that was essential. Officially Whylan shot Johns and you, the mysterious attacker, shot Whylan. Ewart was imprisoned and will be able to tell his story. Naturally

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he de-activated all the recording devices before you arrived. With the information I was able to give him, he will very soon be Dictator of Kindy. Being now able to appreciate the power of the Terran League he will be less bellicose than the former military junta with their dreams of conquest." Ludec nodded. "On the whole a very successful operation."

"You—" Leaver clipped the controls on automatic and stared at the little man. "Do you mean to say that you engineered all that happened?"

"Of course not, how could I? I merely used what little ability I possess to predict certain events on the lines of extrapotential logic." Ludec chuckled. "Certain things were surely obvious from the beginning. The facade of piracy, for example, would never have deluded the League. My capture and the reasons for it were obvious. Without being boastful I knew that the League would never permit the risk of my assisting the Federation to continue."

"You know," said Leaver thoughtfully, "I've the idea that you didn't need outside help at all."

"You are wrong." Ludec was emphatic. "I did nothing, you understand, I was merely a catalyst. The show of force by Ross, the diplomatic threats of Carson, your own assassinations, all brought things to a head. They were, to me at least, obvious steps in a pattern which had to be followed once I had been captured."

"I see." Leaver felt a little deflated. "The Outworlders never knew what trouble they were buying when they grabbed you. Talk about the worm in the woodwork!"

"I beg your pardon?"

"You know, burrowing from within, that's what you did. Just like a worm in the woodwork. You'd make a good Special Agent."

"Thank you." Ludec was always polite.

"Well," said Leaver. "We did rescue you."

"What's the date?" asked Ludec. He smiled at Leaver's expression. "I was completely isolated," he explained, "and lost track of time. Still, I did have a wonderful chance to work out the logical schedule of events. Would you mind telling me the date?"

Leaver told him. Ludec sighed.

"I must be slipping," he said. "You're two days late." ■

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« Continued from page 5 »

three-one-ways-and-a-dead-end. That, too, could be avoided; all one needed to do was to refrain from entering any of the one-way streets—or abandon your car after being trapped, and walk out on foot.

He viewed my discussion as an effort to get out of a ticket. He obviously had no intention of reporting the situation to anyone with authority to change the local police rules.

I stopped at the next police substation along the Thruway; the attitude of the troopers there was precisely the same. They were totally disinterested in discussing the matter; it wasn't *their* job. I should tell it to the Judge.

And the explanation of how a stupid booby-trap situation like that could exist for years becomes obvious. The fact that each Thruway service area has a police-ruling booby trap is not obvious, and will not, of course, be discovered by any Thruway official, or senior police official, because (1) they know the design of the stations beforehand, and (2) they wouldn't get ticketed anyway.

The result is that, because of the attitude of the cop-on-the-beat, the higher officials who do have the authority and the duty of changing police rulings when they produce irrational results . . . are totally unaware that the situation exists!

The real gimmick that kept the Thruway Authority blissfully unaware of their goof is the reason why neither I, nor anyone else caught in that booby trap, would "tell it to the Judge."

As in many metropolitan areas, in New York state you can plead guilty to summonses of the traffic-ticket type by mail. In New York City, a parking ticket can cost you $15; the Thruway ticket is cheaper—$5.

But to plead Not Guilty . . . it costs you about $200. The legal machinery of pleading not guilty to a traffic ticket is essentially the same as that involved in pleading Not Guilty to first degree murder. This is a democratic country, and every man has a right to defend himself in court. It's only necessary to appear in person at a highly inconvenient court, and hire a lawyer, to enter the Not Guilty plea. A trial date is then set, and a return engagement to try the case is required.

Is it any wonder that no one caught in that unintentional booby trap ever "told it to the Judge" as Officer George invited me to?

Officer George and his fellow troopers agreed completely and quite sharply that it was not their job. Well . . . who's job is it? Is it the duty of Mr. Average Citizen, who gets caught in the thing, to spend $200 or so telling it to a local Justice of the Peace? Particularly in view of the unfortunate, but nevertheless real fact that, statistically speaking, local JP's aren't apt to bother to fight their own local police force in favor of some out-of-state stranger anyway. And it isn't the JP's job anyway . . .

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So . . . the odds being what they are, who would expect any useful result even if he did spend $200? It would take a crusading fanatic to try, even!

That is the situation; now let's consider the reasonably predictable consequence of not just this one instance, but of the multiple instances of the problem of minor brushes with laws and/or police rules.

The broad principle deducible from this setup comes out this way: It says in the textbooks that our legal system is based on the postulate "innocent until proven guilty," as distinct from the Napoleonic Code postulate of "guilty until proven innocent." That's clearly stated in the textbooks.

But clearly practiced in the real world of modern affairs is something quite different from either thesis. It comes out "Those who claim innocence, *whether proven or not*, will be punished with $200 expenses; those who plead guilty, on the other hand, will be punished lightly."

Be it remembered that nearly every citizen gets ticketed for some minor infraction sooner or later, no matter how law-abiding he may be; the number of citizens who directly encounter the law and the courts for minor matters—and run into that $200-penalty-for-pleading-your-innocence—is enormous. The number who have occasion to plead Not Guilty to first degree murder, and encounter that innocent-till-proven-guilty doctrine is large only among the ranks of professional criminals.

Overwhelmingly the statistical Average Citizen is a man who's been *shown* he dare not plead his innocence, and been *told* he is innocent until proven guilty. And who has seen those guilty-to-his-knowledge of major crimes get off easily.

In New York City you don't have to own anything to get ticketed; if you live in a boarding house, and don't own a car . . . you can get ticketed for walking across the street, dropping a scrap of paper on the sidewalk, or forgetting to throw away your cigarette when you walk down the subway steps.

The poorest citizen encounters these things . . . but he is a peaceable man, never commits a murder, robs a bank, or rapes his neighbor's wife, so he never encounters that theory about innocent-till-proven-guilty. He's guilty-because-the-cop-made-out-a-ticket-period.

What the legal *thesis* is makes no difference whatever. The economic *facts* are as stated.

Perjury is a serious offense under the law—but the present system induces an innocent man to commit perjury and swear he is guilty even though he is totally innocent. And since it is necessary to have your signature on the traffic ticket notarized, the guilty-by-mail plea is legally perjury.

That is, the system powerfully encourages the victim to scoff at the laws against perjury, and renounce his right to trial. It saves the State officials an immense amount of work.

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The Average Citizen has one defense against this system; simply ignore the whole business—pay no attention whatever to the summons. The ponderous legal machinery of the State is now so cumbersome that the State can't afford to prosecute the guilty! They've made the individual's defense of his innocence so cumbersome he can't afford it—so the individual hides in the cumbersome mess in defense.

New York City officials have been sounding off loudly about "scofflaws", and noisily prosecuting a few outstanding examples. (Including one who, to the general embarrassment of the legalists, had scoffed at several hundred tickets . . . and was a municipal judge!)

An attorney acquaintance to whom I related the contretemps suggested that the sensible thing for me to do was to ignore the whole thing. This man is the chief counsel for a major corporation.

And the New York authorities don't understand why there are so many scofflaws . . . ?

When you find yourself at that three-one-ways-and-a-dead-end intersection, the legal thing to do may be to abandon your car and walk out . . . but the practical thing to do is to scoff at the irrational laws, and drive out.

Notice that the above statements concern thoughtful and rational evaluations of the problem—not the emotional grinding effects that a sense of helpless subjection to injustice produces. The corporation counsel is not a man living at bare subsistence level, to whom $5 or $15 could mean a major change in the family's weekly or monthly diet. His reaction of "Oh, forget it!" was one of irritated annoyance at a petty stupidity.

Potentially, every man has a right to his day in court. But . . . does a right exist, if there is no possible access to the right?

Criminals have always hated the police, and fought against them. But in recent years all the major cities report a rising—an alarmingly increasing—tendency of ordinary average citizens on the streets who attack and interfere with police officers attempting to arrest someone. The bystanders gather angrily, shoving and cursing the police officer—fists, then rocks start flying.

It's not a matter of the arrested man being a friend, a local, well-liked figure—but of being simply someone-the-cop's-arresting.

It's almost as though the average citizen felt deeply that when a man was arrested, he had no chance of getting justice—as though they did not scoff at the law, but dully hated and resented it.

Why?

I think it's because, today, the cop-on-the-beat has been trained to say "It ain't my job!" The sob-sisters have long insisted that it isn't the Juvenile Delinquent's fault he's a thorough-going dastard; it's Society's fault. Well—the argument applies

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very accurately in the case of the modern police officer—he's doing precisely what Society said it wanted, and producing a result that Society can't possibly live with.

He's giving us—by public demand—exactly what the People said they wanted; a government of laws, not of men—laws enforced with perfect equality to all, without fear or favor . . . *and utterly without thought or judgment.*

The public philosophy that sent the cop-on-the-beat out with a book of no-fix tickets, said "We don't trust you, and you have no business judging your fellow man of course, so do exactly what you're told and shut up."

Then they improved things; they added a quota to his book of judgment-forbidden tickets.

They got back precisely what the inevitable consequences always have been when the cop-on-the-beat is forbidden to use judgment. He's taught—and that means commanded!—that his job is to enforce the laws, not to judge them. Leave that to the Judges! That he doesn't make the laws, and isn't to think he should. That he is to enforce the laws "without fear or favor," which is a high-sounding, nobly worded phrase meaning "without the use of judgment".

The result is deep public resentment at the level of the subsistence-level citizen, and scofflaws at higher economic and educational levels.

The reason's quite simple; it's precisely the reason that led to the American Revolution, and that the Founding Fathers, by reason of direct personal experience, sought to exclude from our nation. It's called "suppression of local autonomy." The Declaration of Independence is, in simplest terms, a statement of complaints that the King didn't listen to. The King's agents no doubt said, "Look, it ain't my job to figure out whether the laws make sense—my job's enforcing them! If you don't like it, tell it to the King!"

The problem is, was, and always will be the *necessity*—not simply the desirability, but the absolute necessity—of an effective degree of local autonomy.

A machine that's built with zero free play—with rigid bearings, locked up tight—will have play within a very short time. Either the bearings yield, or they just simply burn out.

The most important level in the whole mechanism of government is not the King, President, Governor, Supreme Court or High Legislature—it's the cop-on-the-beat. Bearings burn out and ruin the whole machine, when the *surfaces in contact* get in trouble. True, if the engine's main structures crack, the bearings are thrown out of line, and ruin sets in. If the armature windings slip loose, ruin takes a few milliseconds. But it's the surfaces-in-contact that are crucial—and in the social machine, it's the contact between Citizen and Cop-on-the-beat that constitutes the essential wearing surface.

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The next most important level of government is the Justice of the Peace, the Local Magistrate—whatever he may be called. Every citizen, every day, must have direct contact with the cop-on-the beat; immediately behind the cop-on-the-beat is the police sergeant—in a small town, the Chief of Police—and immediately backing the police officers is the Justice of the Peace.

They're making bearings now with antifriction metal only a few thousandths of an inch thick, with hard steel backing; under heavy pounding loads at high speeds, the relatively soft antifriction metal couldn't carry the load if it weren't closely and strongly backed.

The Justice of the Peace system has broken down to a deplorable degree. The public image presented routinely in movies, TV, and fiction generally is either that of a rather futile figure, or the venal small-town hayseed who presides at the local stranger-trap.

And these things stem from the public demand that men shouldn't judge their fellow men. Some months back, I pointed out that the essence of law and order is Prejudice—which is Law—Discrimination—which is judgment—and Force—for law is meaningless without an agency to carry it out. Law is simply a series of statements "These things we judge wise, and intend to sustain:—" The Declaration of Independence is a series of statements of Prejudices—i.e., things *judged previously* to be sound and necessary.

The cop-on-the-beat can no longer be the "good cop" in a modern city; it *isn't* his job—his right!—any more to use judgment. But it's just as dangerous, in its own way, to have a cop who holds, "I don't make the laws; I'm not responsible for what they do!" as it is to have one who says "I don't make my pistol; I'm not responsible for what it shoots."

He didn't make the gun—but he is responsible for the way he uses it. He didn't make the laws—but isn't it essential that he hold himself responsible for how he uses them?

He can't do so today; his superiors won't listen to his complaints—his reports of irrationality of laws—and so he can't listen to the citizen's complaint.

The ideal "good cop" establishes such relationships of mutual understanding with the people on his beat that he doesn't have to write more than one or two summonses a month, arrest more than one or two people a month for disturbing the peace. Or arrests the known drunk on his beat Saturday night about 10:00 p.m. when he's merely in the feeling-no-pain stage, and before he's reached the belligerent stage, or gone home and beaten up his wife.

But that isn't Law; that's judicious police work. It's not illegal to be a little tipsy; the cop has no legal reason for hauling Tom Souse in to sleep it off. He's *not* enforcing the law—he's using judgment!

For this you get suspended from the force today. Got no business judging your fellow man!

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The "good cop" definitely does not treat all men equally; he favors one over another—because he knows his people. The small-town cop is still able to be an antifriction bearing in the society; the average-citizen attacks on police officers aren't in the small towns, but in the great cities, where the People's demand for inhuman legalism—i.e., government by law, not men—has been complied with.

The "good cop" who knows, and works with the people on his beat can't exist—or can't display his abilities!—in the modern city system. He doesn't give out his quota of summonses; obviously a man who gives out so few summonses isn't properly enforcing the law!

Officer George complied fully with the modern police philosophy; don't bother your superiors with citizen's complaints, because that's not your job. Hand out the quota of summonses, because that's necessary. He's a busy man doing a job—and it genuinely isn't his fault that the rules of the job have been laid out the way they have.

Somebody goofed when they laid out the modern big-city police rules. Those rules themselves are a three-one-ways-to-a-dead-end system. But . . . who do you complain to, huh? The People demanded it be that way—and *now* who can complain, and to whom, for God's sake?

We didn't want local autonomy—and now we haven't got it.

But I think I could tell Police Commissioner Murphy of New York why his police officers are being attacked, more and more interfered with by Average Citizens.

I don't have any hand-dandy, quick-and-snazzy solution to offer. The last time Americans found themselves oppressed by lack of local autonomy they revolted against the English King who'd done it to them.

How do you revolt against yourself, when you, the People, have done this injustice to you, the People? ■

IN TIMES TO COME

Next issue we've got an article that's special enough to warrant mention in this department—"Power Supplies for Space Vehicles," by J. B. Friedenberg.

Now here on Earth, electric power costs a few cents a kilowatt hour. A thousand miles up, it costs thousands of dollars! In a space satellite, a solar cell bank delivering (maybe! We hope!) 200 watts, and costing a million dollars, is a happily accepted bargain . . .

Esoteric power-generation systems that would never be considered elsewhere are getting a real investigation—and are portents of real science-fiction advances in power technology!

The Editor.

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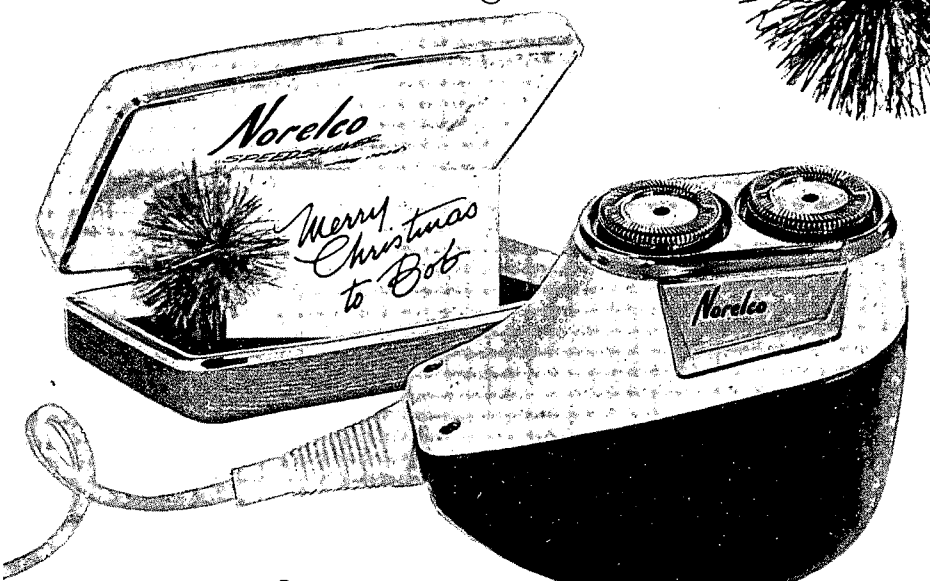

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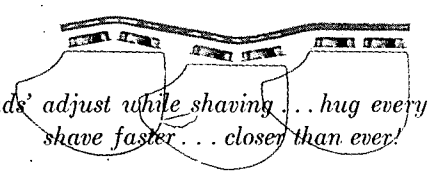

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